

DO BANKS AID AND ABET ASSET CONCEALMENT: EVIDENCE FROM THE PANAMA PAPERS

James D. Omartian

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Approved by:

Eva Labro

Robert Bushman

John Graham

Jeffrey Hoopes

Mark Lang

Edward Maydew

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ABSTRACT

JAMES D. OMARTIAN: Do Banks Aid and Abet Asset Concealment: Evidence from the Panama Papers.

(Under the direction of Eva Labro)

Using new data from the Panama Papers, I find investors and banks undermine regulation clamping down on foreign tax evasion by establishing opaque legal structures in tax havens. However, this concealment strategy is only effective when investors view their offshore bank as a reliable evasion partner. When they believe offshore banks will violate their trust and cooperate with the tax authorities, investors make fewer incorporations and increase closures of offshore entities. My study provides a rare direct look at investors' and banks' actions taken to increase opacity and informs debate on international cooperation to combat offshore tax evasion.

To my amazing wife and children.

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CHAPTER 1

INTRODUCTION

Cash-strapped governments have been vocal about the problem of offshore tax evasion. For example, a 2008 US Senate staff report estimates that “offshore tax abuses” result in an annual loss to the US Treasury of \$100 billion in tax revenue (United States Senate Permanent Subcommittee on Investigations 2008). While the size of this estimate is in dispute, most agree that the true loss is quite large, and that the US is not the only country to lose revenue. However, despite the economic importance, academic research has struggled to advance our understanding of the shadowy dynamics of the offshore financial industry. This dearth of evidence is particularly problematic given the cost and reach of regulatory reforms enacted to target offshore evasion. By its very nature, tax evasion is a secretive activity, and data availability is the chief obstacle to empirical research in the area. However, the recent “Panama Papers” leak, detailing over 200,000 offshore entities created by the Panamanian law firm Mossack Fonseca, provides a fresh opportunity to observe investors interacting with the offshore financial industry. Using these new data and exploiting a series of regulatory reforms as quasi-natural experiments, this paper explores the influence of financial institutions on investors’ efforts to conceal offshore financial activity from tax authorities.

The seminal theoretical paper on tax evasion, Allingham and Sandmo (1972) characterizes tax evasion as a gamble against possible detection by the tax authority. This model is an extension of the Becker (1968) economic model of crime—investors will under-report income if the expected benefits of evasion (lower tax) outweigh the expected cost (probability-adjusted penalty for getting caught). However, because many assets (e.g. securities, real estate, bank accounts) have a recorded owner, tax authorities can fairly readily track down egregiously underreported income. Cremer and Gahvari (1994) introduces the concept of “concealment technology,” where for a cost, investors can reduce the probability of detection. My paper focuses on the use of one type of concealment

technology: offshore entities.

The strategy works as follows. An investor contracts with a service provider like Mossack Fonseca to incorporate a legal entity, and interposes the entity between him- or herself and the assets, creating an ownership chain. Provided the entity is incorporated in an offshore financial center jurisdiction, this chain can be particularly opaque. These jurisdictions—often called tax havens because they impose few to no taxes—generally do not require disclosure of shareholder identities, making the asset’s ultimate economic owner virtually undetectable to an outside observer. While the use of an offshore entity is legal, failing to report income earned by the offshore entity to the investor’s home country typically constitutes evasion.

As a concealment technology, offshore entities do have a weak point—to be of any use they typically need a bank account. Banks are required to conduct due diligence on the source of funds to make sure the account is not used for money laundering or sponsoring terrorist activity. As a result, even though an account may be held in the entity’s name, the financial institution will often know the identity of the beneficial owner, and so the probability of detection depends on the bank not sharing this identity information with the tax authorities. When making their evasion and concealment decisions, investors must factor in their expectations that the bank will maintain this secret going forward.

Maintaining secrecy and facilitating evasion provides the banks with a revenue stream, but organizations like the OECD and European Union have begun to apply pressure on banks to cooperate with the international tax authorities. This pressure prompts investors to downwardly revise their beliefs about the bank’s willingness to protect the investor’s identity going forward. Assuming the offshore banking business is competitive, pressured banks will need to compensate their depositors for the added risk of detection. I test for this effect empirically using the EU Savings Directive (EUSD) as a source of pressure.

Under the EUSD, banks must cooperate with the tax authorities in other EU member states by either exchanging account information or withholding tax on interest income that the account

holder can recoup through self-disclosure. However, a significant loophole exists: corporate accounts are not subject to the EUSD's information exchange and withholding tax provisions. Thus, using an offshore entity is an ideal method to defang this additional risk. After showing in the data that the EUSD prompts affected investors to incorporate offshore entities, I test for a bank response. I predict and find that to lower the investors' risk of detection and to stave off loss of market share to banks not covered by the EUSD, EUSD-area banks push investors into using offshore entities.

So long as the pressure on the bank is sufficiently low (e.g. there is minimal risk of government reprisals), the revenue stream from the offshore business can serve as a bonding mechanism, credibly communicating the bank's commitment to maintaining secrecy (Konrad and Stolper 2016). However, competition in the offshore banking industry limits the available rents, prompting the bonding mechanism to break down under sufficiently strong pressure.¹ Thus, I predict when the pressure on banks is high, investors no longer trust the bank will keep their identity secret, prompting the abandonment of offshore entities as concealment.

I test this hypothesis using three settings. First, I exploit a revision to the EUSD which broadened the EUSD's scope beyond individual accounts and required banks to identify and report EU beneficial owners of corporate accounts. Unlike the first iteration of the EUSD where banks could resist cooperation with the tax authorities by taking advantage of a weakness in the law, to continue shielding the investor's identity under the new rule EU-area banks would need to directly violate the law. I predict that EU investors anticipate that under the stronger law, banks will not be able to withstand the pressure to cooperate with the tax authorities, and as a result, the investors close their offshore entities. Second, I look at the effect of the US's Foreign Account Tax Compliance Act (FATCA). I expect FATCA, which requires foreign financial institutions to comb through accounts for potential US investor ownership, depresses the effectiveness of offshore entities as a concealment technology. As a result, I predict that US investors create fewer offshore entities in

¹Key to this explanation is that pressure is applied to some, but not all banks, resulting in a subset of banks able to maintain secrecy at lower cost. Elsayyad and Konrad (2012) notes that in sequentially forcing providers out of the offshore business, the remaining participants face lower competition and earn higher profits, making it harder to drive them out of business. As a result, a piecemeal approach can be more expensive than a coordinated worldwide attack and potentially counterproductive.

response. Third, I predict that when Swiss banking secrecy is undermined, investors that use Swiss bank accounts as part of their offshore concealment schemes are more likely to close down their entities.

There are a few reasons why my predictions may not hold. First, the use of offshore entities for nefarious purposes may be limited and investors may simply have nothing to hide from their home governments. If that is the case, investors may derive no tax benefits from them, and hence disclosure may have minimal effect. Second, I hypothesize investors modify their behavior in response to changes in their beliefs about banks' willingness to cooperate; investors may believe the regulatory changes will have no bite on banks. Lastly, given the sheer quantity of information to be exchanged and complexity of the international banking industry, governments, especially smaller, less-developed ones, may be ill-equipped to make meaningful use of their new information channels, resulting in no appreciable increase in the probability of detection and hence no increase in the expected costs of evasion.

I find that investors in affected countries increase the number of offshore entity incorporations by 73% just prior to the roll-out of the EUSD. Furthermore, I find that this activity is not just investor-driven; banks actively coordinate the creation of entities on behalf of their clients with a 3-1/2 fold increase in the rate of entity incorporations driven by banks. Once the EUSD is strengthened, investors curtail their use of offshore entities; entities created specifically to circumvent disclosure to the government are two to five times more likely to close than benchmark entities after the draft amendment was issued strengthening the EUSD. Along the same vein, I find that FATCA results in a roughly 30% reduction in incorporation activity US investors. I also find that the closure rates for entities that likely use Swiss bank accounts increase by 33% and 49% in response to the UBS deferred prosecution agreement and the introduction of the US Department of Justice's Swiss bank program respectively. Together, these empirical results suggest that expectations of bank behavior heavily influence investors' use of offshore entities as a concealment technology.

A threat to the validity of my inferences is that given the incorporations in the Panama Papers were all executed by Mossack Fonseca, the data may not be representative of the industry as a whole. To rule out this possibility, I repeat variants of my tests using another recent leak of offshore entities: the Bahamas Leaks. This dataset contains all entities—regardless of the service provider—created in the Bahamas. Adapting some of my tests to this new dataset, I observe consistent results, suggesting that my findings are not limited to Mossack Fonseca.

My study contributes on a number of fronts. First, I bring new data to bear on the question of offshore tax evasion. Zucman (2013) estimates that 8% of worldwide household wealth is held in tax havens. Despite this massive accumulation, our understanding of how investors interact with the offshore industry is thin. Hanlon and Heitzman (2010) notes that tax planning strategies fall on a continuum of legality—benign, clearly legal actions like the use of municipal bonds on one end to illegal actions such as evasion and non-compliance on the other—and argues that the aggressive end of the spectrum is most interesting to academics and policymakers. However, data availability is a major obstacle to making progress in this area. What prevents detection from tax authorities also typically makes evasion unobservable to the researcher. The Panama Papers offers a unique opportunity to view the decisions to form and dissolve offshore entities at the individual investor level, providing a rare glimpse into actions taken primarily for anonymity reasons. I employ these data to detect “traces of non-compliance” (Slemrod and Weber 2012), similar in spirit to Hanlon, Maydew, and Thornock (2015). Other studies in finance have used leaked confidential datasets to observe questionable activity (Mironov 2013; Griffin, Kruger, and Maturana 2016; Grieser, Kapadia, Li, and Simonov 2016).² To the best of my knowledge, my study provides the first academic look at the Panama Papers entity data.³

Second, my paper brings to the fore the role banks play in facilitating or fighting offshore tax

²In 2013, the International Consortium of Investigative Journalists released a much smaller leak of offshore entity data from different entity providers. To the best of my knowledge, Caruana-Galizia and Caruana-Galizia (2016) is the only study to explore this precursor dataset. Given its coverage period only covers one of the regulatory changes I explore, this dataset is ill-suited to my study.

³In concurrent work, O’Donovan, Wagner, and Zeume (2016) links 397 Orbis firms to the Panama Papers files to determine the price effects of the data release. That study finds that firms with connections to the Panama Papers experience negative returns concurrent with the release.

evasion. The regulations I explore conscript financial institutions into policing investors on behalf of the tax authorities. However, banks have strong business incentives to provide lax monitoring on this front (Picard and Pieretti 2011). Thus, it is unclear how banks will respond. On the heels of the financial meltdown, there is a growing interest in the culture of dishonesty in banks (e.g. Cohn, Fehr, and Maréchal (2014)). While other streams of research in finance explore the complicity of financial institutions in other illegal behaviors such as mortgage fraud (Piskorski, Seru, and Witkin 2015; Griffin and Maturana 2016), little empirical evidence exists documenting the extent to which financial institutions help or hinder tax evasion. Chernykh and Mityakov (2017) is an exception, which using leaked data from the Russian Central bank, finds that Russian banks with heavy transactional flows to offshore financial centers are more likely to have employees and client firms that evade taxes. Gallemore, Gipper, and Maydew (2016) looks at the role of banks in corporate tax planning, but it studies tax planning in general—not offshore evasion.

Third, my findings inform the debate on regulatory efforts to control offshore tax evasion. The regulatory changes I explore are non-trivial, and hence an ex-post evaluation of their outcomes is important in weighing the costs and benefits. For example, in 2014, Canada’s top five banks estimated they had spent nearly \$700 million in initial costs to comply with FATCA, despite the fact that FATCA is a US law (Trichur 2014). There has been some work evaluating the the EUSD (Johannesen 2014; Klautke and Weichenrieder 2010; Hemmelgarn and Nicodème 2009), but those papers look at the initial implementation alone and do not explore bank reactions. To the best of my knowledge, no study has documented the joint bank and investor reactions to the amended EUSD or the US clamp down on Swiss banks. One concurrent study explores FATCA, inferring effects from changes in Foreign Direct Investment in US securities (De Simone, Lester, and Markle 2017).

Fourth, while the setting is tax, my study contributes to the disclosure literature. Leuz and Wysocki (2016) notes the importance of mandated disclosure for shaping behaviors, and calls for additional research on the incentive role of disclosure regulation, particularly outside of a capital markets setting. The regulatory changes I explore do not change the legality of the investor activity. Rather, they seek to discourage tax evasion through increased disclosures from financial

institutions.⁴

⁴While combating tax evasion is their express purpose, the regulations I explore may have spillover effects to curbing other unsavory activity. In my setting, I am unable to distinguish if investors shun disclosure to the government to conceal tax evasion in particular or some other illicit behavior.

CHAPTER 2

INSTITUTIONAL CONTEXT

For corporations, most countries impose a territorial taxation system such that only local income is subject to tax in the home country. Thus, for companies in territorial countries, shifting income to low tax jurisdictions—either through locating real activities there or moving profits on paper—can reduce tax expense. The US is one of the few remaining countries that have a worldwide taxation system, which taxes US corporations' income regardless of where it is earned. However, shifting income to low tax jurisdictions does allow US corporations to defer their tax expense until they repatriate the profits to the US, potentially creating savings if the US implements a repatriation tax holiday. Tax havens provide corporations with a low- or no-tax jurisdiction to locate some of their profits.

International taxation for individuals operates differently. Most countries tax residents on their worldwide income and do not allow for deferral.¹ As a result, simply shifting income to a low- or no-tax foreign jurisdiction does not provide de jure income tax relief. However, tax havens can be very useful for investors that wish to under-report income to their home country's tax authority. One method is for investors to relocate assets to low- or no-tax jurisdictions and earn profits on their investment there. So long as information about the investment does not get reported back to the investor's home country tax authority, the investor can evade taxation at home.

A related way that tax havens allow individuals to under-report their income is through disguising asset ownership. A number of tax haven jurisdictions let foreign investors create legal entities²—sometimes called “shell corporations” or more pejoratively “sham corporations”—catered

¹The United States is an exception, taxing all US residents and all US citizens regardless of domicile. Thus, retiring to a tax haven does not eliminate US tax liability for wealthy American investors unless they renounce their US citizenship.

²Depending on the jurisdiction, these entities can be corporations, partnerships, foundations, and trusts. While each

to investing anonymously. These offshore entities have minimal legal restrictions. Typically no more than one shareholder is required, and if maintained, share registers are kept with the entity's registered agent (e.g. Mossack Fonseca) and not disclosed to the government. Paperwork requirements are also designed with opacity in mind. Annual reports are typically not required, and entities generally do not file tax returns in their incorporation jurisdiction. There are no requirements that economic activity happens in the offshore jurisdiction, and in fact many jurisdictions require it to occur *outside* their borders to receive tax-free treatment. Typically, the only requirement is that the registered agent has an office in the jurisdiction.

As the beneficial owner of an offshore entity, an investor can conduct anonymous investment activity worldwide—even in the investor's home country—using the offshore entity's name. This anonymity in and of itself is not illegal and can have value for the investor for a myriad of reasons. For investors residing in countries with weak property rights, using an offshore entity may prevent government expropriation. Investors buying property or acquiring a firm may want to conceal their identity from the counterparty for an edge in negotiations. Assets in the entity's name are harder to discover through the legal process, potentially shielding them from seizure in litigation. Of course, the anonymity also allows investors to simply not report taxable income that was earned by the offshore entity. While the use of an entity is legal, for most investor countries failing to report an offshore entity's income to the investor's home country constitutes illegal evasion.³

of these have different requirements and structures, the Panama Papers data do not distinguish among them. Given this data limitation, and since these entities can be used to serve similar purposes, I also make no distinction between them in this study and for expositional ease refer to them collectively as offshore entities. Pooling these entity types may add noise to my tests and likely biases against finding results.

³Controlled Foreign Corporation (CFC) rules, which are widely prevalent, essentially treat foreign income from shell companies as if it were domestic income.

CHAPTER 3

DATA

3.1 Mossack Fonseca and the Leak

Mossack Fonseca resulted from the 1986 merger of two Panamanian law firms run by Jürgen Mossack and Ramón Fonseca. The practice has since grown to over 500 employees with offices in every continent. The firm provides a broad array of services designed to set up and manage legal entities such as corporations, trusts, and foundations in tax haven jurisdictions. For the majority of entities created, Mossack Fonseca works with intermediaries rather than the clients directly. These intermediaries, such as other law firms, banks, financial institutions, and accountants, advise the client and conduct much of the administration involved with operating an offshore entity, with Mossack Fonseca's role limited to incorporating the entity and maintaining its registration with the relevant authority. In other cases Mossack Fonseca provides full service directly to clients.

In early 2015, an anonymous source began leaking what would become 11.5 million Mossack Fonseca internal files to the German newspaper *Süddeutsche Zeitung*. Faced with the sheer size of the leak and the challenges making sense of this data, *Süddeutsche Zeitung* turned to the International Consortium of Investigative Journalists (ICIJ) to process the 2.6 terabytes worth of data, much of which was contained in image-based files. After a year of data processing and investigative work, ICIJ member newspapers began publishing investigative articles on April 3, 2016.

The leak contains records dating back to the 1970s documenting the creation of over 200,000 offshore entities. The data implicate over 140 politicians and public officials in schemes to hide assets overseas, including associates of Russian President Vladimir Putin, the brother-in-law of Chinese President Xi Jinping, the family of Pakistani Prime Minister Nawaz Sharif, and UK Prime Minister David Cameron's father. Under immense pressure, Prime Minister of Iceland Sigmundur

David Gunnlaugsson resigned when the Panama Papers revealed his holdings of an offshore company that held Icelandic bank debt during the country’s banking crisis. Politicians are not the only names mentioned in the leak; FIFA officials, professional athletes, and actors featured prominently.

3.2 Organization of the Data

The data leaked to *Süddeutsche Zeitung* include details like bank account information and client communication records. However, ICIJ has not publicly released data beyond the entity database. The database released¹ consists of three main data files: one for entities, one for officers, and one for intermediaries. In the entity file, each record corresponds with an offshore entity created by Mossack Fonseca. Included in these entity records are the entity’s name, incorporation date, and a legal jurisdiction (incorporation country). The officer file consists of a list of persons (natural and legal) that have a stake in an entity along with a country and in many cases an address. Each record in the intermediary file contains the name, address, and country of a firm that interfaces with the ultimate investor.² The data do not categorize officers (e.g. person, company, etc.) or intermediaries (e.g. bank, law firm, etc.), but this information is often apparent from the names. Thus, when necessary I classify officers and intermediaries using text filters. The power of the Panama Papers data is the connections the database makes between the three files.

Consider the following hypothetical example. Assume in February 2005 “Joe Bloggs,” a UK resident approaches “Omega Investment Services” a Luxembourg wealth management firm for help managing his portfolio and perhaps reducing his UK tax exposure. Together they decide it would be advantageous to deposit funds in “Lambda Bank” in Luxembourg.³ Because the UK government has no authority over Lambda, the bank does not share Joe’s account information with HM Customs, the UK tax authority. So long as Joe does not self-report, HM Customs has little ability to tax profits on this portfolio. However, to further conceal his wealth, Joe and Omega

¹Available on the ICIJ website at <https://offshoreleaks.icij.org/pages/database>

²Entities also frequently have a physical address listed, but this address is typically the same as the linked intermediary and not the location of real economic activity.

³For ease of exposition I describe the portfolio as a simple cash bank account. In actuality, the portfolio likely contains securities and other financial instruments. In such a case, the Luxembourg bank would act as a fiduciary—maintaining custody of the assets while Joe remains the beneficial owner. Such a relationship is analogous to a brokerage account.

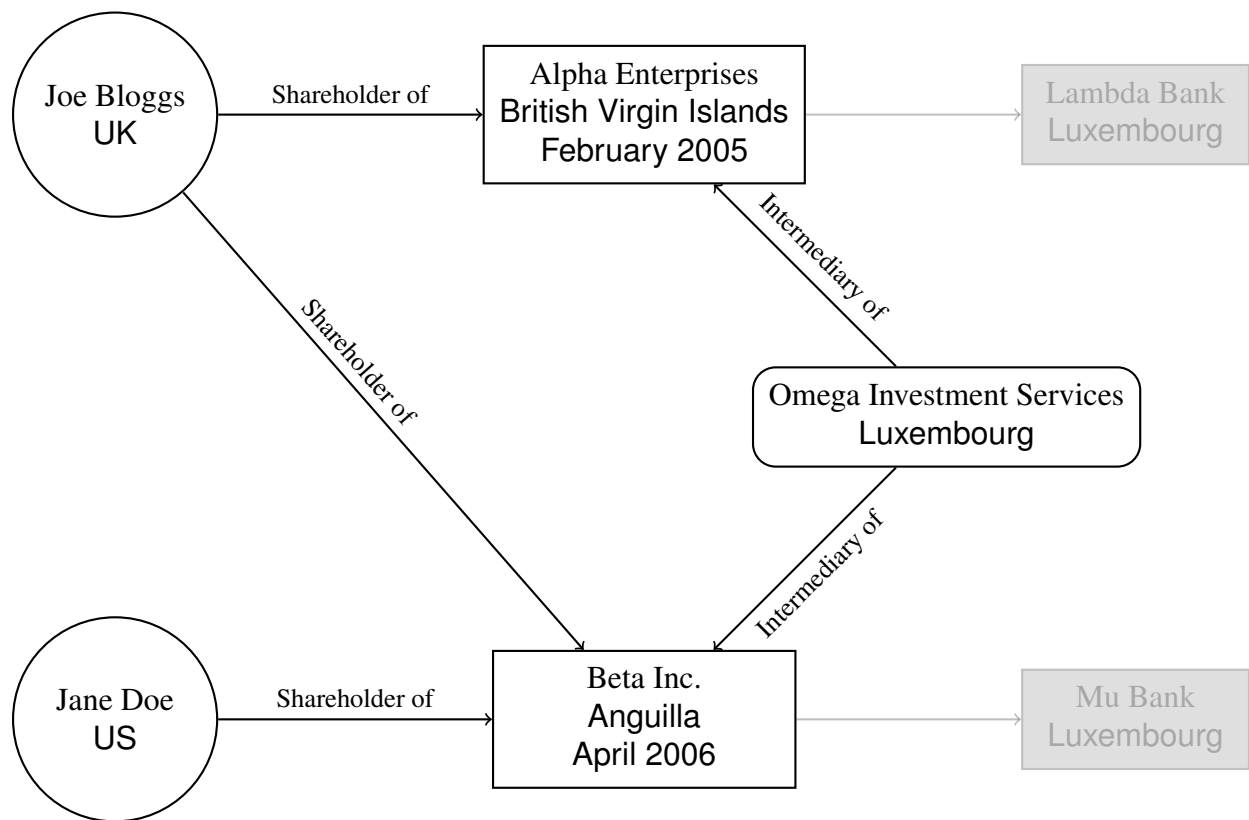
decide to create an offshore entity called Alpha Enterprises—a company that is solely owned by Joe but conducts no real economic activity. Joe can transfer title of his assets to Alpha while maintaining beneficial control, and have Alpha in turn deposit the assets with Lambda. Omega Investment Services contracts with Mossack Fonseca to create Alpha Enterprises in the British Virgin Islands (BVI) on behalf of Joe.

Now assume in April 2006, Joe and his American business partner “Jane Doe” again approach Omega Investment Services for help managing their partnership’s assets. They decide to create an entity called “Beta Inc.” with Joe and Jane each as shareholders. Omega again turns to Mossack Fonseca for incorporation services, but this time they incorporate Beta in Anguilla. Joe and Jane transfer title of their partnerships assets to Beta and have Beta open up an account with “Mu Bank,” also in Luxembourg, to deposit the assets.

Figure 3.1 illustrates how these structures would appear in the data. The black-and-white portions appear in the data, whereas the gray elements are not captured. I observe both Joe and Jane, their respective countries, and their “shareholder of” relationships with Alpha and Beta. I can see the incorporation dates (and closing dates if applicable) for Alpha and Beta along with their jurisdictions (BVI and Anguilla). I also observe the involvement of Omega Investment Services as an intermediary in the creation of both Alpha and Beta. The data do not however contain the bank information.

My hypotheses concern the offshore incorporation activity driven by investors in particular countries. As in my hypothetical example, one entity can have multiple investors, sometimes spanning multiple countries. As a result, for most of my tests I cannot use the entities themselves as the unit of analysis. Thus, my measure of incorporation activity is the count of new investor-entity pairs created in a given month. For the example in Figure 3.1, I would count three pairs. The first would be a UK-BVI pair created in February 2005. The second and third would be a UK-Anguilla and a US-Anguilla pair each created in April 2006. For ease of exposition, I refer to the creation of these pairs as incorporations.

Figure 3.1: Example of the Panama Papers data structure. This figure depicts two hypothetical investors and two hypothetical entities—one which is held by a single investor and one held by both investors—along with the intermediary that worked with Mossack Fonseca to set up the entities. I consider the creation of the three “shareholder of” links as three “incorporations.” The data do not capture the grayed out elements (financial institutions when the financial institution is distinct from the intermediary).



3.3 Descriptive Statistics

Table 3.1 lists the number of entities in the sample, broken down by the number of investors. The “All Investors” columns present entities by number of linked shareholders in the entire Panama Papers database. Most entities have a only a handful of investors. In many instances the shareholders themselves are from a tax haven country; in these cases the listed shareholder is typically not the beneficial owner and the entity may be part of a multilayer structure. Additionally, the investor’s country is often not populated. Typically, this occurs because the entity is set up with bearer shares. Bearer share entities are owned by whoever holds the physical stock certificate; no official share register is maintained. In the data, bearer shares appear with the investor having the name “The Bearer” or similar and no country information. In the “Non-Haven, Non-Missing Country Investors” columns I exclude shareholder links where the shareholder’s country is a haven per Gravelle (2009) or missing, as these links don’t provide investor location information. Excluding these links results in 79,037 entities with no shareholders with valid country information.

Table 3.1: Multiple investor entities. This table lists the frequency of entities with various numbers of shareholder investors. The “All Investors” columns consider all of the investor-entity links in the Panama Papers Data. The “Non-Haven, Non-Missing Country Investors” columns consider investor links where the investor’s country is populated and not a tax haven country per Gravelle (2009). Missing investor country information typically denotes an entity with bearer shares.

Investors per Entity	Entities	All Investors		Non-Haven, Non-Missing Country Investors		
		Percent	Cumulative Percent	Entities	Percent	Cumulative Percent
0	0	0.0	0.0	79 036	65.6	65.6
1	55 765	46.3	46.3	28 090	23.3	88.9
2	33 038	27.4	73.7	8166	6.8	95.7
3	11 805	9.8	83.5	2488	2.1	97.8
4	11 709	9.7	93.2	1231	1.0	98.8
5	3290	2.7	96.0	577	0.5	99.3
6	1742	1.4	97.4	289	0.2	99.5
7	894	0.7	98.1	158	0.1	99.6
8	520	0.4	98.6	104	0.1	99.7
9	285	0.2	98.8	62	0.1	99.8
10	367	0.3	99.1	41	0.0	99.8

Panel A of Table 3.2 breaks down incorporation activity since 2000 by investor country. While

the OECD has been leading the charge in combating offshore tax evasion, many non-OECD countries rank highly. Panel A also lists the percentage of shareholders by country that are individual people. To determine if the shareholder is a natural person or another entity, I apply a text filter on the name to search for a list of company terms (e.g. “Inc.”, “S.A.”, etc.) based on the name standardization algorithms used by the NBER patent project.⁴ While there is some heterogeneity from country to country, the majority of shareholders in the data appear to be individual investors.

Offshore jurisdictions are quick to point out there are many legitimate reasons for investors to use an offshore entity aside from tax avoidance. For instance, tax haven jurisdictions typically have strong governance and legal institutions (Dharmapala and Hines 2009), potentially offering a more stable or less restrictive environment in which to conduct business than some investors’ home countries. Also, investors may be shielding their identities for reasons unrelated to taxes—holding assets in a legal name may help companies shield expansion plans and property acquisitions from the prying eyes of competitors. On the flip side, doing so can also facilitate expropriation and tunneling (Chernykh 2008). Looking at the data in Table 3.2, Panel A, it appears that tax evasion is not the only reason for setting up an offshore entity. For instance, the United Arab Emirates imposes no tax on individual income and hence UAE investors would not derive a tax benefit from their use. However, the country ranks sixth in terms of incorporation activity, suggesting that in all likelihood, UAE investors are using offshore entities for reasons unrelated to investor-level tax evasion.

Because little real economic activity takes place in the entity’s jurisdiction location, investors face a choice in where to incorporate. Panel B of Table 3.2 list incorporation activity by jurisdiction. I tabulate activity for all incorporations and incorporations where the investor is known to be located in a non-haven country. For Mossack Fonseca’s entities, the most common jurisdiction is the British Virgin Islands, but sizable incorporation activity occurs in 5 additional jurisdictions:

⁴I base my filters on Jim Bessen’s adaptation of the Derwent Standardization, which can be downloaded at <https://sites.google.com/site/patentdatapoint/Home/posts/namestandardizationroutinesuploaded>. If any of the standardized terms are found in the name, I categorize the officer as a non-person.

Table 3.2: Country descriptive statistics. Panel A lists the most active investor countries (excluding investors located in haven countries per Gravelle (2009)) by incorporations since 2000. The “Percent Individual” columns denote the percentage of that country’s incorporations where the investor name does not have a company word in it using the name standardization process used in the NBER patent data project. Panel B breaks down incorporation activity by offshore jurisdiction since 2000 for all investors and non-haven, non-missing country investors.

Panel A: Incorporation activity by investor country

Country	Incorporations	Percent Individual	Country	Incorporations	Percent Individual
China	23 438	98	Guatemala	420	88
United Kingdom	4604	75	Ukraine	397	98
Taiwan	3537	92	India	390	94
United States	3494	84	Japan	356	95
Russia	3368	98	New Zealand	352	40
United Arab Emirates	3093	83	Philippines	348	93
South Africa	2010	97	Greece	307	100
Uruguay	1816	88	Egypt	287	96
Brazil	1707	92	Zimbabwe	282	84
Malaysia	1514	90	Belgium	269	98
Peru	1469	99	Haiti	265	71
Australia	1182	80	Germany	260	90
Indonesia	1023	99	Netherlands	245	72
Colombia	1007	92	Dominican Republic	212	82
Italy	958	98	Mexico	212	97
Argentina	932	97	Czech Republic	210	98
Israel	829	94	Iceland	205	99
France	812	98	Pakistan	197	100
Ecuador	795	96	Nigeria	182	91
Canada	790	83	South Korea	171	94
Thailand	781	91	Kenya	170	95
Spain	689	95	Portugal	168	77
Saudi Arabia	671	72	Hungary	154	100
Venezuela	613	99	Chile	146	94
Turkey	536	98	Kazakhstan	142	97

Panel B: Incorporation activity by offshore jurisdiction

Offshore Jurisdiction	All Investors		Non-Haven, Non-Missing Country Investors		Bearer Shares
	Incorporations	Cumulative %	Incorporations	Cumulative %	
British Virgin Islands	154 213	57.0	44 348	67.3	19 195
Panama	56 744	77.9	2298	70.8	44 288
Seychelles	23 841	86.7	9672	85.4	10 502
Bahamas	13 662	91.8	2312	88.9	1878
Samoa	12 289	96.3	4113	95.2	2188
Anguilla	3624	97.7	2391	98.8	40

Panama, Seychelles, Samoa, the Bahamas, and Anguilla. The data suggest that certain jurisdictions may be optimized for specific structures. For example, Panama dominates the bearer share incorporation activity.

CHAPTER 4

EMPIRICAL ANALYSIS

4.1 Individual Account Information Exchange: EUSD

Taxpayers are more likely to evade taxes when income is self-reported (Kleven, Knudsen, Kreiner, Pedersen, and Saez 2011). However, when a third party reports income information to the tax authority, taxpayers have far less opportunity to avoid detection of underreported income. To target the estimated \$2 trillion in European wealth hidden in tax havens where it has influence (Alstadsæter, Johannesen, and Zucman 2017), the European Union in June 2003 enacted the EU Savings Directive (EUSD). The EUSD requires banks in participating states¹ to identify individual (non-corporate) accounts held by EU residents and report account information to the account holder's home country. States with strong bank secrecy regimes—the jurisdictions standing to lose the most with successful third-party bank reporting across country lines—understandably objected, so the EU allowed for an alternate compliance method. Instead of exchanging account information, participating states can opt to withhold a tax on interest income for account holders residing in an EUSD country.² To avoid the withholding tax, on an individual basis depositors could elect to report their identity and interest income information to their home country's tax authority.

I explore two responses to the EUSD: investor response and bank response. I predict and

¹In addition to the EU member states, the EUSD applied to Andorra, Anguilla, Aruba, British Virgin Islands, Cayman Islands, Curaçao, Guernsey, Isle of Man, Jersey, Liechtenstein, Monaco, Montserrat, San Marino, St Maarten, Switzerland, and the Turks and Caicos. The EUSD took effect on July 1, 2005 except in Bulgaria and Romania where the effective date was January 1, 2007.

²EU member states Austria, Belgium, and Luxembourg opted to apply a withholding tax, along with Andorra, Liechtenstein, Monaco, San Marino, Switzerland, Jersey, Guernsey, Isle of Man, the British Virgin Islands, the Turks and Caicos, Curaçao and St Maarten. The remaining EU member states along with Anguilla, Aruba, the Cayman Islands, and Montserrat opted for bank disclosure. Beginning in 2005, the withholding rate was 15%, which increased to 20% in 2008 and 35% in 2011. As a compliance incentive, the jurisdiction where the account was located shares the proceeds of the tax: 75% flows to the depositor's home country and 25% stays with the jurisdiction where the account is located. Although the investor's home country receives proceeds from the tax, no information identifying account holders accompanies the funds.

find that EU investors increase their use of offshore entities to circumvent the information sharing and withholding tax provisions of the EUSD. I also predict and find that EUSD-area banks in jurisdictions with strong bank secrecy laws respond to the EUSD by actively orchestrating the creation of offshore entities for their customers' benefit.

4.1.1 Investor Response

The EUSD has a number loopholes that motivated investors can employ to avoid its provisions.³ Pertinent to my study, investors can shift the account to being held by a corporate entity. By creating a legal entity (anywhere in the world) and deposit funds in the legal entity's name, the investor can circumvent the disclosure or withholding tax provisions (Commission of the European Communities 2008). Because of their flexibility, secrecy, and lack of income taxation, offshore entities are aptly suited for this concealment purpose. Employing country-level bilateral deposit data from the Bank of International Settlements, Johannesen (2014) finds concurrent with the EUSD a reduction in Swiss bank deposits from EU depositors and a corresponding increase in Swiss bank deposits from Panamanian depositors. This evidence is consistent with investors transferring title of deposits to offshore entities in Panama and keeping the funds in Switzerland.

I use investor response to the EUSD to validate my measure of offshore incorporation activity against prior research. I predict that in the months leading up to the July 1, 2005 EUSD effective date, investors in countries facing the automatic reporting of interest income or withholding tax take steps to protect themselves and scramble to incorporate offshore entities. Once the roll-out occurs, I predict the flurry of activity subsides, but that the level of incorporation activity after the effective date remains somewhat higher than before the EUSD run-up. While the pre-July 1 activity likely reflects steps taken to protect existing deposits, a post-July 1 increase likely accounts

³Both the disclosure and any withholding tax apply only to individual interest income. As a result, investors can shift to non-interest-based investments or change holdings to grandfathered assets that were not subject to the directive's provisions. However, prior research finds that investors do not pursue these methods. Klautke and Weichenrieder (2010) finds no increase in the demand for grandfathered assets, and Hemmelgarn and Nicodème (2009) does not observe a shift away from interest-bearing assets.

for effort shielding new foreign deposits. I employ the following model:

$$Incorporations_{it} = \alpha_1 MarJul2005EU_{it} + \alpha_2 PostJul2005EU_{it} + \beta_i + \gamma_t + \varepsilon_{it} \quad (4.1)$$

where i indexes investor country and t indexes the month and year. $MarJul2005EU_{it}$ takes a value of 1 if country i is subject to the EUSD⁴ and $t =$ March, April, May, June, or July 2005, and 0 otherwise. I include the first month of the EUSD effective period (July 2005) to account for stragglers, or if there is measurement error in the incorporation date. $PostJul2005EU_{it}$ takes a value of 1 if i is subject to the EUSD and t is August 2005 or later. β_i is a country fixed effect and γ_t is a month-year fixed effect. ε_{it} is an error term. Because the distribution of incorporations is highly skewed, I estimate Equation (4.1) using two operationalizations of $Incorporations_{it}$. I use an indicator variable equaling 1 if investors from country i incorporated any new entities in month t , and 0 otherwise. I also employ a logarithmic transformation where I take the natural log of one plus the number of new incorporations from the country i in month t . I employ OLS to avoid the incidental variables problem inherent with estimating non-linear models using fixed effects. I cluster the standard errors by country-jurisdiction pairs and month.

If incorporation activity increases in anticipation of the EUSD effective date, α_1 should be positive. I estimate the model using investor country-month observations of incorporation activity from 2002 through 2007. Table 4.1 presents the results. As predicted, the estimates in Columns (1) and (2) suggest an increase in incorporation activity from EUSD investor countries. I observe an increase of 20 percentage points in the probability of there being offshore incorporation activity from an EUSD country in the months prior to the EUSD taking effect. Similarly, I observe a roughly 73% increase in the quantity of incorporations ($e^{0.551} = 1.73$). Once the EUSD comes into force, the incorporation activity indeed subsides relative to the pre-July 1 rush, but remains higher than the early period.

⁴Consistent with Johannesen (2014), I consider treated only those countries that were EU members prior to the 2004 EU enlargement. New accessions undergo structural changes that may confound my estimation of the EUSD effect. My results are robust to including 2004 accession countries in the sample.

Table 4.1: EUSD and Incorporation Activity. This table regresses incorporation activity for a given investor country i and month t on an indicators if i is a EU country and t falls in a specified window. The time window for $MarJul2005EU_{it}$ is March, April, May, June, or July 2005, and the window for $PostJul2005EU_{it}$ is August 2005 and onward. In Column (1), the dependent variable is an indicator variable if investors in country i incorporated entities during month t ; in Columns (2)-(6) the dependent variable equals the natural log of 1+ the number of incorporations from country i in month t . Column (3) fully interacts the model from (2) with an indicator if the investor is a person (non-company), and column (4) is a within-country analysis of treated countries. Column (5) allows EU nations to have a different linear time trend. Column (6) includes $StockMarketGrowth_{it}$, the percentage growth in country i 's stock market from the same month in the prior year, and $CPIGrowth_{it}$ which measures the year over year percentage growth in the seasonally adjusted consumer price index for month t in investor country i . Each column includes observations of incorporations from 2002 through 2007 where the investor country is not a member of the 2004 EU enlargement. The model is estimated using OLS with standard errors clustered by investor country. *, **, and *** denote two-sided statistical significance at the 10%, 5%, and 1% levels respectively.

	Indicator		Log Transformation			
	(1)	(2)	(3)	(4)	(5)	(6)
MarJul2005EU	0.204*** (0.048)	0.551** (0.217)	0.015 (0.065)		0.598** (0.240)	0.536** (0.250)
PostJul2005EU	0.072 (0.046)	0.196* (0.118)	-0.071* (0.037)		0.288* (0.163)	0.276 (0.174)
MarJul2005EU \times Person			0.565** (0.245)	0.630* (0.355)		
PostJul2005EU \times Person			0.348*** (0.101)	0.443*** (0.143)		
EUTrend					-0.028 (0.029)	-0.056* (0.032)
StockMarketGrowth						0.001* (0.0003)
CPIGrowth						-0.003 (0.003)
<i>Fixed Effects</i>						
Investor Country:	Yes	Yes	No	No	Yes	Yes
Month and Year:	Yes	Yes	No	No	Yes	Yes
Investor Country \times Person Indicator:	No	No	Yes	Yes	No	No
Month and Year \times Person Indicator:	No	No	Yes	No	No	No
Investor Country \times Month and Year:	No	No	No	Yes	No	No
N	12,288	12,288	24,576	2,160	12,288	3,502

Given the EUSD affected individual accounts, I should only detect an effect when the shareholder is a person. In Columns (3) and (4) I split the dependent variable into incorporations based on whether or not the shareholder listed in the data is a personal name. In Column (3) I interact the covariates, investor country fixed effects, and time fixed effects with an indicator if the investor is a person. This specification allows me to determine both if treated countries increase relative to control countries and if the increase was concentrated in the non-corporate investors. I find no significant increase for the non-person investors in EU countries during the run-up period; the entire effect is concentrated in the person-held entities. In Column (4) I conduct a within-investor country analysis, using each investor country’s person-held incorporations as the treatment groups and the corresponding non-person-held incorporations as control groups. I do so by limiting the sample to EU countries, including investor country \times time fixed effects along with investor country \times person fixed effects, and including the interacted covariates. The advantage of this specification is that it rules out my results being driven by country-level, time-varying differences between the treatment and control groups. Again, I find an increase for the run-up period, which falls in the post-implementation period but remains higher than the pre-period.

While investor country fixed effects account for time-invariant differences across investor countries, and time fixed effects allow for monthly differences in the average country’s incorporation activity, the model does not account for divergent changes at the country-level over time. To guard against this possibility producing spurious results, I estimate two additional specifications. I employ the approach outlined in Angrist and Pischke (2014) and in column (5) I allow the treatment group to have its own linear time trend, relaxing the parallel trends assumption somewhat. In Column (6) I control for changes in the market and economic conditions in the investor country directly using monthly data from the World Bank’s Global Economic Monitor dataset. I include *StockMarketGrowth_{it}*, growth in the investor country’s stock market from the same month in the prior year, which controls for the effects of changes in investor wealth driving incorporation activity. I also add *CPIGrowth_{it}*, year-over-year growth in country i ’s seasonally-adjusted consumer price index for month t , to control for inflationary pressures. During periods of high inflation at

home, investors may increase their use of tax havens as a safe location to preserve the value of their wealth. My findings are robust in both specifications.

Lastly, I probe the parallel trends assumption more directly by looking at intertemporal dynamics. In Figure 4.1 I plot coefficient estimates and associated 90% confidence intervals for the following equation:

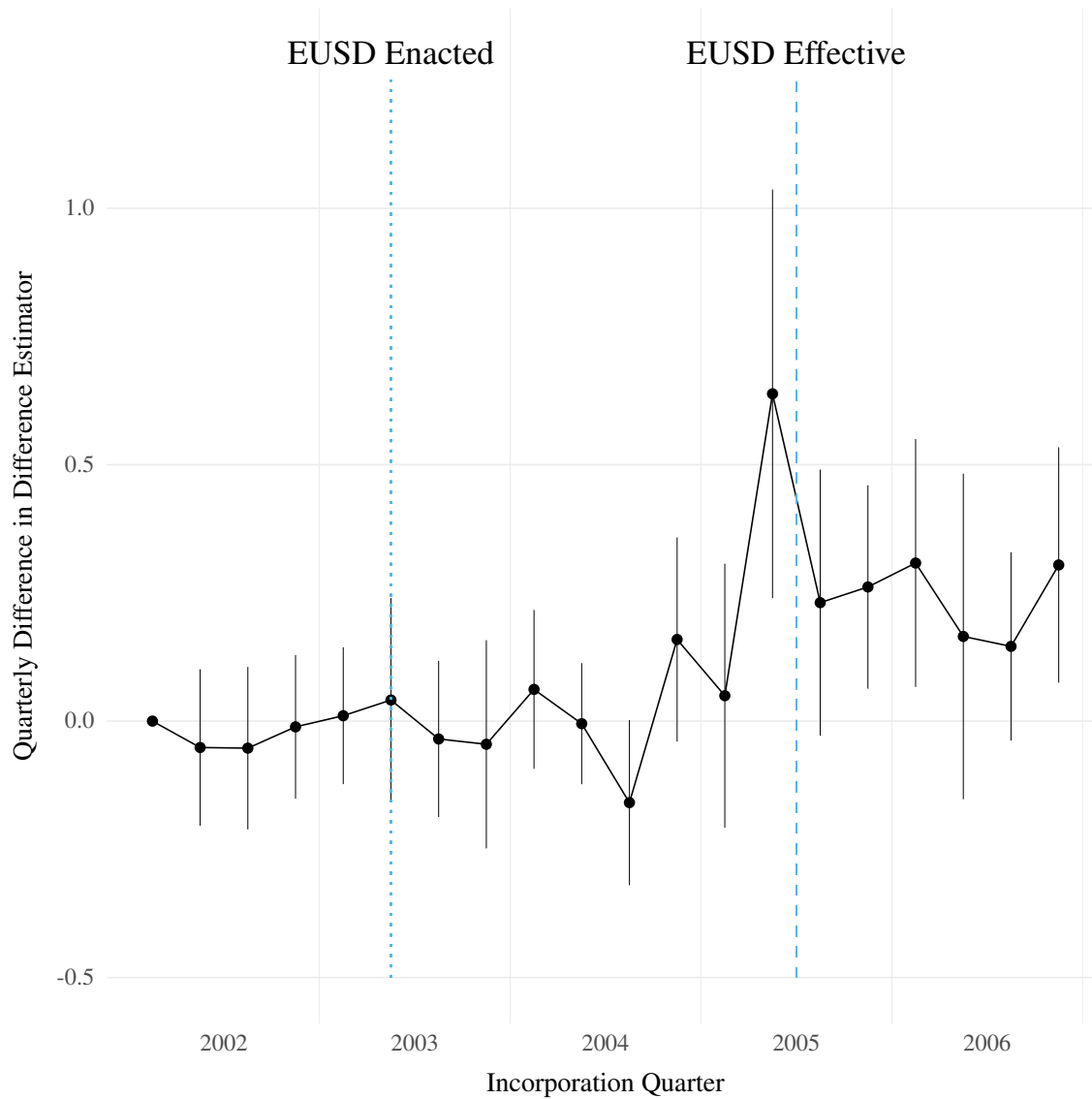
$$\begin{aligned} \ln(1 + \text{Incorporations}_{it}) = & \alpha_1 Q2_2002_EU_{it} + \alpha_2 Q3_2002_EU_{it} + \dots \\ & + \alpha_{19} Q4_2006_EU_{it} + \beta_i + \gamma_t + \varepsilon_{it} \end{aligned} \quad (4.2)$$

where QX_200Y_EU is an indicator that turns on for treated countries in the X^{th} quarter of year 200Y. Thus each point on the graph represents the difference-in-difference estimate for a particular quarter, using January 2002-March 2003 as the reference period. Consistent with the parallel trends assumption, there is no difference between treated and control observations until the last quarter before the EUSD implementation. Then, I observe a large spike as investors rush to conceal their foreign assets, followed by a post-implementation equilibrium with a significantly higher level of incorporation activity from treated countries' investors. The precision of the spike before implementation makes it highly unlikely that the behavior I observe is caused by something other than the EUSD rollout.

4.1.2 Bank Response to EUSD

Another method for investors to circumvent the bank information exchange or withholding provisions of the EUSD would be for investors to close their EUSD-area foreign bank accounts and open accounts in a non-EUSD jurisdiction such as Singapore. This possibility is particularly harmful to banks in the EUSD area on two levels. First, a rash of withdrawals could undermine the banks' solvency and prompt a run (Diamond and Dybvig 1983; Goldstein and Pauzner 2005). Second, the loss of EU investors could result in non-EU investors losing trust that the EUSD tax havens will remain non-cooperative with non-haven governments going forward. Konrad and Stolper (2016) presents a model of tax havens where investors obtain strategic complementarities

Figure 4.1: Quarterly differences in incorporation activity. This graph depicts coefficient estimates and associated 90% confidence intervals from estimating: $\ln(1 + Incorporations_{it}) = \alpha_1 Q2_2002_Treated_{it} + \alpha_2 Q3_2002_Treated_{it} + \dots + \alpha_{19} Q4_2006_Treated_{it} + \beta_i + \gamma_t + \varepsilon_{it}$ where i denotes investor country and t denotes month and year. $Q2_2002_Treated_{it}$ is an indicator if i is an EU treated country and t is April, May, or June 2002. The other quarterly indicators are created similarly. The model is estimated on monthly incorporation counts from January 2001 through December 2006. January 2001 through March 2002 is the reference period. For the analysis, I exclude 2004 EU accession countries and those on the Gravelle (2009) tax haven list from those implementing the EU Savings Directive (the final EUSD country list is: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom). June 3, 2003 (depicted by the dotted blue line) is the EUSD enactment date and July 1, 2005 (depicted by the dashed blue line) is the effective date for information exchange or withholding tax for applicable account holders.



by investing in the same tax haven. Because high profits on tax haven business serve as a commitment device for the haven country to withstand political pressure to cooperate with non-haven governments, investors derive benefit from coordinating tax haven use. Without profits from the EU investors, the amount of political pressure it takes to compel the EUSD-area tax havens to cooperate decreases, making their use riskier for non-EU investors. Thus, the EUSD-area banks, and by extension their respective governments have a strong incentive to help their clients circumvent the EUSD's provisions.

I predict that to stave off EUSD-induced depositor flight, affected banks take steps to signal to EU account holders that their accounts will remain anonymous. One way they can do so is by making the transition to an offshore entity seamless for their account holders, taking on the logistical efforts and thus bearing some of the costs of the concealment technology. Thus, I test if affected banks take an active role in facilitating tax evasion by orchestrating the creation of offshore entities. The intermediary data of the Panama Papers allows identification of which entities were created under the direction of a bank.

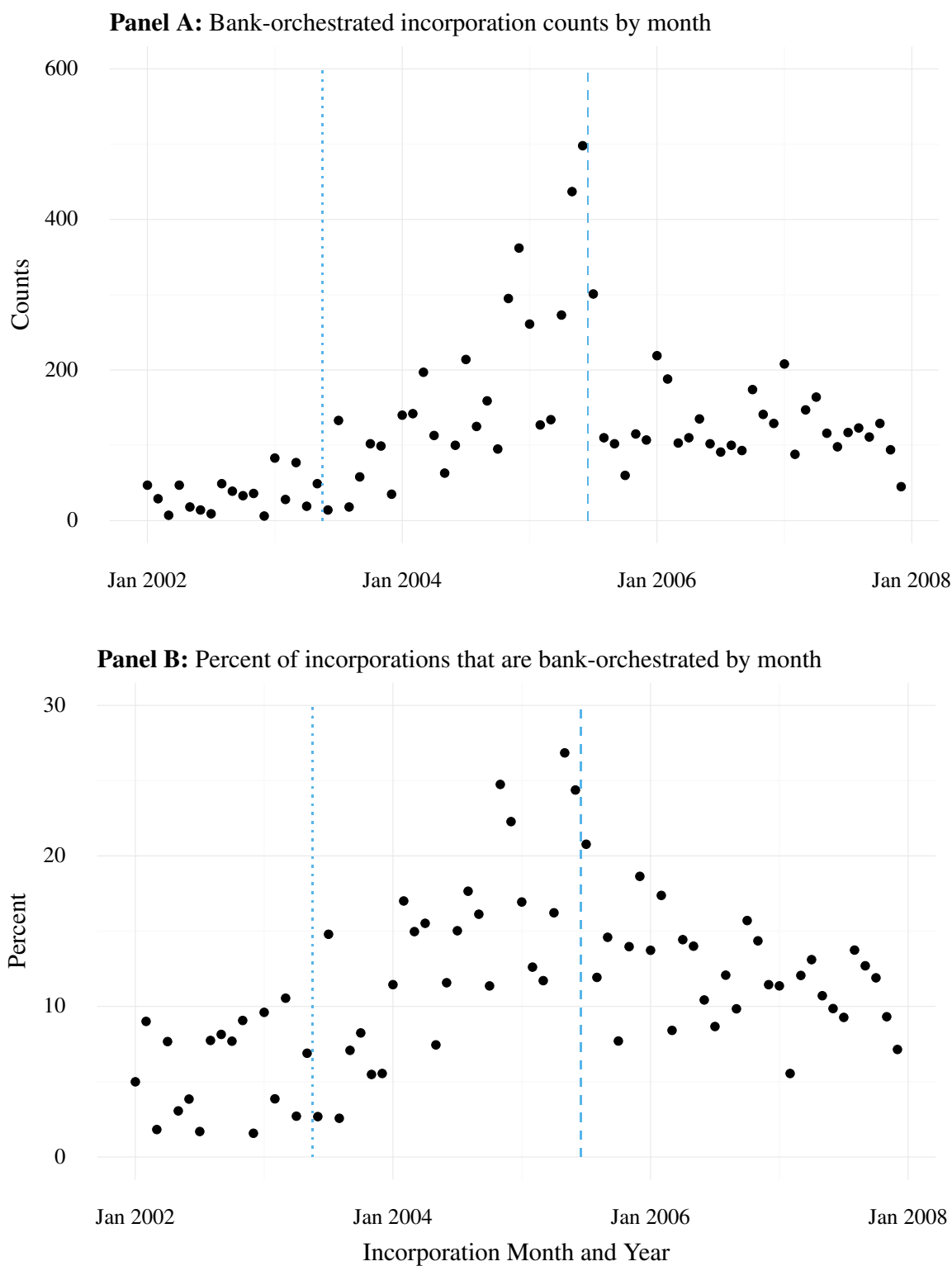
I categorize intermediaries as banks if their names include any of the substrings "BANK", "BANC", "BANQU", "CREDIT", or "CRÉDIT". This classification results in 256 bank intermediaries, though many represent multiple branches of a parent bank. For instance, there are separate intermediary entries for HSBC Private Bank in Switzerland, Monaco, Luxembourg, Guernsey, Jersey, and the United States. The vast majority of the time when the bank serves as the intermediary, it creates a bearer share entity. This arrangement affords a high level of anonymity for the investor because whoever holds the physical share certificates is the owner of the company; no ownership registry is maintained by Mossack Fonseca or the incorporation jurisdiction. It also allows banks to orchestrate the process of setting up an offshore entity on behalf of a high-value depositor without violating bank secrecy and sharing the depositor's information with Mossack Fonseca. However, it in turn means the bearer's identity (and hence home country) is not observable in the Panama Papers data. This gap in investor country information limits the strength of my tests of bank complicity in circumventing the EUSD.

To detect a bank response to the EUSD, I analyze intertemporal changes in the rate of bank involvement in offshore incorporations. Figure 4.2, Panel A presents the monthly counts of incorporations with bank intermediaries. After enactment of the EUSD (depicted by the left dotted vertical line), the number of bank-facilitated incorporations per month increases dramatically up to the effective date (depicted by the right dashed vertical line). After the effective date, the number of incorporations falls but remains higher than before the EUSD was enacted. While this spike in Panel A is dramatic, it does not reveal if the increase in bank-facilitated incorporations is a result of a numerator effect (banks representing a disproportionately large share of the activity) or a denominator effect (overall incorporations increasing). Panel B tracks the monthly percentage of incorporations with a bank intermediary. The similar plot pattern to Panel A suggests that the increase is not driven solely by a denominator effect; banks facilitated a disproportionately large number of incorporations in the lead-up to the EUSD's effective date.

Table 4.2 tests for statistical differences in the proportion of incorporations facilitated by a bank. I partition incorporations into 4 periods: Pre-enactment (January 2002 - May 2003), Early Run-up (June 2003 - February 2005), Late Run-up (March 2005 - July 2005), and Post-implementation (August 2005 - December 2007). Panel A presents the counts and proportions by time period. Prior to the EUSD's enactment, bank facilitated incorporations represent 6% of the overall activity. However between the enactment and effective dates, bank involvement grows steadily to nearly 21% of incorporation activity. After the effective date passes, bank involvement falls to just under 12%. Panel B breaks down the bank-driven incorporations by bank country and time period. The primary bank countries are all locations where the bank would be subject to the EUSD's withholding regime and at risk for depositor flight. The increase being concentrated in EUSD-area banks is comforting, as I predict the effect is limited to these banks.⁵ Panel C presents the results of χ^2 tests of equal proportions using the data from Panel A. The changes in bank involvement are all highly statistically significant, as is a test of an increasing linear trend in bank

⁵However, the low involvement from non-EUSD banks precludes my using them as a control group in a difference-in-difference design.

Figure 4.2: **Bank-orchestrated incorporation activity.** Panel A depicts the monthly incorporation counts where the linked intermediary has a bank term in its name (“BANK”, “BANC”, “BANQU”, “CREDIT”, or “CRÉDIT”). Panel B presents the counts from Panel A scaled by the overall monthly incorporation counts, expressed as a percentage. June 3, 2003 (depicted by the dotted blue line) is the EUSD enactment date and July 1, 2005 (depicted by the dashed blue line) is the effective date for information exchange or withholding tax for applicable account holders.



involvement between the enactment and effective dates.

Table 4.2: Bank orchestration of offshore entity creation. This table presents incorporation activity when the name of the intermediary linked to the offshore entity contains a bank term (“BANK”, “BANC”, “BANQU”, “CREDIT”, or “CRÉDIT”). The sample is all Panama Papers Officer-Entity pairs with an incorporation date between January 1, 2002 and December 31, 2007.

Panel A: Bank involvement by time period

Period	Dates	Bank	Non-bank	Proportion
Pre-enactment	Jan 2002 - May 2003	590	9204	0.06
Early Run-up	Jun 2003 - Feb 2005	2852	18 894	0.13
Late Run-up	Mar 2005 - Jul 2005	1643	6304	0.21
Post-implementation	Aug 2005 - Dec 2007	3519	26 642	0.12

Panel B: Bank involvement by bank country

Country	Counts				Percentages			
	Pre	Early	Late	Post	Pre	Early	Late	Post
Luxembourg	360	2092	1098	2686	41.0	66.3	61.5	67.1
Switzerland	167	334	298	662	19.0	10.6	16.7	16.5
Monaco	45	235	292	365	5.1	7.4	16.4	9.1
Andorra	0	204	1	14	0.0	6.5	0.1	0.3
Guernsey	113	109	46	85	12.9	3.5	2.6	2.1
Jersey	157	58	8	6	17.9	1.8	0.4	0.1
Other	37	123	42	184	4.1	4.0	2.4	4.4

Panel C: χ^2 Tests of equal proportions

Comparison	χ^2 Test Statistic	P-Value
Pre-enactment to Early Run-up	348.5	0.000
Pre-enactment to Late Run-up	854.5	0.000
Pre-enactment to Post-implementation	254.6	0.000
Early Run-up to Late Run-up	258.3	0.000
Linear Trend during entire Run-up (Jun 2003-Jul 2005)	576.8	0.000

Identification of an EUSD effect on bank involvement using the χ^2 tests assumes that in the absence the EUSD, the proportion of incorporations with bank involvement would not have changed intertemporally. This is an admittedly strong assumption. However, for another force to be causing this intertemporal pattern, it would need to be absent prior to June 2003, increase progressively until July 2005 and then sharply fall. I know of no other reasonable explanation that explains this

distinctive intertemporal signature.

Additionally, the time patterns of the incorporations bolster my story that these incorporations are indeed bank-driven and not investor-demanded. While the narrow spike in incorporations around the EUSD effective date in Figure 4.1 suggests investors waited until the last minute to take action, Figure 4.2 shows that banks—most likely better aware of the impending regulation—acted sooner to preempt depositor flight. Additionally, clustering of bank activity (not tabulated) is consistent with bank-driven behavior. For instance, 187 of the 204 incorporations from Andorra banks during the early run-up period came from one bank during a 4-day window (November 30, 2004-December 3, 2004); it is highly unlikely for so many depositors to request an offshore entity in such a short window. Overall, the results suggest that EUSD-area banks catering to offshore tax evasion were complicit in helping investors circumvent the EUSD, presumably in response to their EUSD-driven competitive disadvantage.

4.2 Individual and Corporate Account Information Exchange

The evidence reported thus far suggests investors and banks employ offshore entities to circumvent the exchange of individual account information. However, the response to exchanging corporate account information as well is an open question. To test the response, I exploit an amendment to the EUSD and the Foreign Account Tax Compliance Act (FATCA).

4.2.1 Amended EUSD

In May 2013 the EU issued a draft amendment to the EUSD that would close the loophole for corporate accounts. The amendment would force EUSD-area financial institutions to look back through pass-through entities to identify beneficial owners of accounts, and use those identities as the basis for withholding tax or exchanging information with the investor's home tax authority. Assuming banks have the information and are compliant, such a change would make offshore entities an ineffective concealment technology for EU investors that use financial institutions in the EUSD coverage area. While the amendment was not passed until December 2014, given the concurrent developments with FATCA, practitioner articles at the time covering the amendment predicted that its eventual passage and implementation was inevitable. As a result, I consider that

in May 2013, investors anticipated that the amendment would eventually be passed, and I predict that after that point in time affected investors are more likely to close down their offshore entities.

As mentioned earlier, investors may use offshore entities for variety of purposes—some of which have nothing to do with tax evasion—and the Panama Papers data do not explicitly state why the entity was created. However, I can take advantage of the introduction of the original EUSD as a source of plausibly exogenous variation in the reason. Given the results in Section 4.1.1, many of the entities incorporated by EU investors around the July 1, 2005 roll-out date are likely created specifically for evading information exchange with the investor’s tax authority. From a research design standpoint, this shock creates differences in the intended usage of entities along two dimensions—cross-country and intertemporally—which allows for multiple control groups in a difference-in-difference framework. By showing using two different benchmarks that concealment-motivated entities are more likely to close in response to the move to exchanging both individual and corporate account information, I am able to rule out potential confounds along investor country and time dimensions.

I conduct a hazard-model adaptation of the standard difference-in-difference design. I categorize entities created by EU investors between March 1, 2005 (four months before the effective date) and July 31, 2005 (one month after the effective date) as evasion-driven, and thus highly-sensitive to the effects of additional corporate account information exchange. I refer to this group as the treatment group. I then employ three reference groups. The first group consists of entities created by non-EU investors over the March-July 2005 period. The second group is entities from EU investors incorporated between January 1, 2002 and June 3, 2003—before the EUSD was enacted. The third is from non-EU, OECD investors over the same pre-enactment period. As entities in these three reference groups were either not affected by the EUSD or were created before the EUSD was enacted, the incidence of entities created primarily for tax evasion purposes should be lower than the treatment group.

Figure 4.3 plots Kaplan-Meier survival curves for entities in these four groups from August 2005 onward. For entities that have been terminated, the data will include one or two end dates.

The “inactivation date” represents the date the investor told Mossack Fonseca to close the entity down. Investors are required to pay annual licensing fees, and if they fail to make a payment, Mossack Fonseca will “strike off” the entity. These striking-off purges happen annually at a minimum.⁶ Although abandoning an entity represents an investor decision not to continue using the offshore entity, the struck-off date does not represent the date the investor chose to stop using the entity. As a result, I consider entities to be right-censored one year before the struck-off date (when the last registration would have been paid) or the end of the sample (December 31, 2015) if there is no inactivation date.⁷

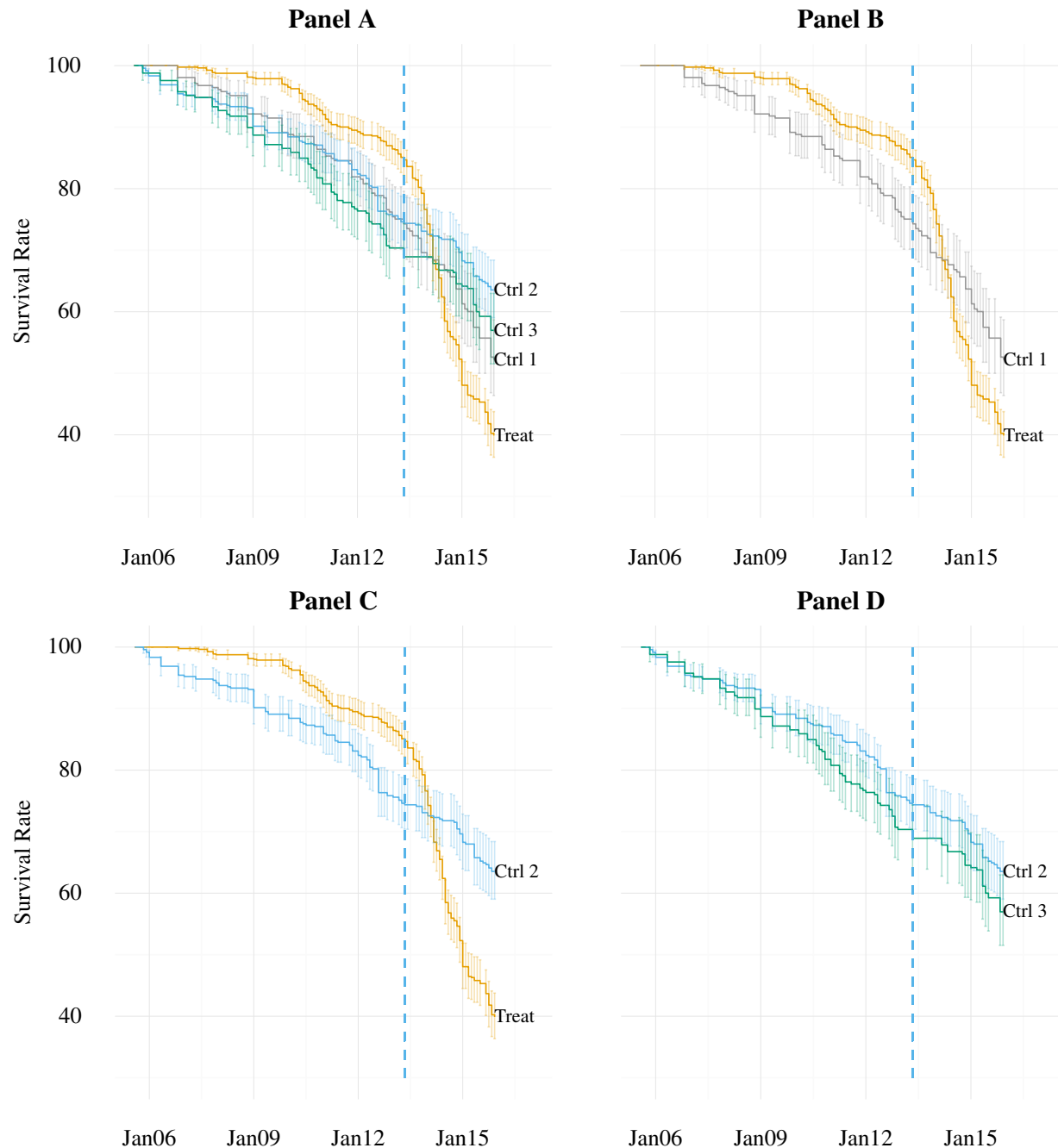
The dashed blue line indicates when the EU issued the draft amendment closing the EUSD loophole. Panel A overlays survival curves from the treatment group and the three control groups. Panels B through D present comparisons between curve pairs for clarity. I first look to see if the closure rate of entities in the treatment group responds to the issuance of the draft amendment. Prior to the draft amendment, entities in the treatment group exhibit a low closure rate, depicted by a shallow curve. This pattern is consistent with the idea that these entities serve a tax evasion purpose—investors would need to maintain these entities so long as they were concealing assets. After the draft amendment the curve becomes substantially steeper, reflecting a much faster closure rate.

Panel B compares the behavior of the treatment group to control group 1: entities contemporaneously incorporated by non-EU OECD investors. This comparison suggests that the increase in closure rate is in response to enhanced information exchange eroding the concealment benefits of entities. Control group 1’s curve is initially steeper, possibly reflective of a greater proportion of the entities being used for more “transactional” purposes. Unlike the treatment group curve, there is no discernible change in slope around the draft amendment, and by March 2014 the two curves

⁶Mossack Fonseca’s purge schedule differs by offshore jurisdiction. Purges happen in the British Virgin Islands each year in April and October. In Panama purges occur in January and July. The Bahamas and Seychelles offices purge entities annually in December whereas the Samoa office purges in February. Purges occur at the end of each calendar quarter in Anguilla.

⁷If I consider struck-off dates to be valid closure dates along with inactivation dates, the curves look virtually identical (figure not included for brevity).

Figure 4.3: Closure response to increased information exchange. This graph plots Kaplan-Meier survival curves based on the investor country and incorporation date. I consider entities to be closed on the “inactivation date” in the data, or right-censored at the minimum of the “struck-off date” or December 31, 2015. The treatment group consists of entities incorporated by EU investors between March 1, 2005 and July 31, 2005. Control group 1 consists of entities incorporated by non-EU, OECD investors contemporaneous with the treatment group. Control group 2 represents entities incorporated by EU investors between January 1, 2002 and June 3, 2003. Control group 3 is entities incorporated by non-EU, OECD investors contemporaneous with control group 2. The error bars depict 95% confidence intervals.



cross, indicating that on a proportional basis, at this point more treatment group entities have been closed than those in control group 1. Thus, the increase in the closure rate around May 2013 for the treatment group seems to be unique to entities incorporated by EU investors.

It is possible that non-EU OECD investors are different from EU investors, and the entities created by them are different along dimensions unrelated to their use as a tax evasion tool. If that were the case, control group 1 would be an unsuitable benchmark. To rule out this possibility, I take advantage of intertemporal differences within the investor country and use control group 2—entities created by EU investors in 2002 and early 2003 (prior to the enactment of the EUSD)—as an alternate benchmark. Comparing control group 2’s curve to the treatment group’s in Panel C, the story is the same as in Panel B. Thus, it appears that the change in closure rate for the treatment group in 2013 is not a result of differences between EU and non-EU OECD countries unrelated to the tax evasion difference. For added comfort, in Panel D I compare control group 2 and control group 3 (entities from non-EU OECD investors incorporated in the pre-enactment period). These two curves move in lockstep, suggesting that in the absence of the EUSD, EU and non-EU OECD investors use offshore entities for similar reasons.

I more formally evaluate these comparisons using a Cox proportional hazard model:

$$h_i(t) = h_0(t) \exp(\alpha_1 \text{TreatmentGroup}_i + \alpha_2(\text{TreatmentGroup}_i \times \text{PostAmendment}_t)) \quad (4.3)$$

where i subscripts entity-investor pairs and t subscripts time (year and month). TreatmentGroup_i is an indicator if the entity-investor pair is from the treatment group, and PostAmendment_t is an indicator if t is after May 2013. $h_0(t)$ is an unspecified, time-dependent baseline hazard function representing closures in the control group. Intuitively, the baseline hazard function can have an arbitrary shape, allowing for time-varying differences in the closure rate; the treatment curve has the same overall “shape,” but has the freedom to pivot at the origin and again at the May 2013 date. I cluster standard errors at the investor country level.

Table 4.3 presents the results. Columns (1) and (2) compare the treatment group to control group 1 (contemporaneous incorporations from non-EU OECD country investors) and control

group 2 (2002 and early 2003 incorporations from EU investors), respectively. Both columns show that initially the likelihood of closure is lower for treatment observations by about 54%, consistent with these entities needing to be maintained so long as the assets were being concealed from the investor's home country tax authority. After the May 2013 date, the hazard rate increases precipitously for treatment group entities relative to both control groups. Compared to control group 1, the hazard rate increases by 411% after the May 2013 date to a rate 2.26 times that of the control group (0.548×4.115). Relative to control group 2, the change is even more dramatic—increasing by 9.21 times after May 2013 to be 5 times that of the control group (0.544×9.210).

Column (3) compares control groups 2 and 3 as a placebo test. If EU and non-EU investors use offshore entities for similar reasons, I should observe no differences. Similar to Panel D of Figure 4.3, I detect no statistically significant differences when employing the same style Cox model as in columns (1) and (2).

The sharpness of the inflection point and its precise alignment with the issuance of the EUSD draft amendment make a strong case that the effect is a result of the regulatory change. However regulatory changes do not occur in isolation, and contaminating forces are potentially at play. One such force is the Common Reporting Standard (CRS), which institutes mandates information sharing like the strengthened EUSD but on a worldwide basis (it was modeled on the US's FATCA program and operates similarly). Countries, however, did not begin committing to CRS implementation until 2014, so while CRS may have contributed to the continued high closure rate late in the analysis period, it cannot explain the inflection point in 2013.

Similarly, over this time period, many of the EU countries had in place voluntary disclosure/tax amnesty programs. Langenmayr (2015) shows that *ceteris paribus*, the existence of such programs increases the incidence of evasion because they provide evaders with the option to come clean if the perceived probability of detection increases. Hence, at the sunset of such a program, investors may be more apt to close their entities while they still can obtain amnesty. If an amnesty program was drawing to a close when the EU issued the draft amendment, the observed increase in entity closures may be a result of the end of amnesty rather than the strengthened EUSD. To rule out

Table 4.3: Closures of evasion-motivated entities. Columns (1) and (2) estimate the model: $h_i(t) = h_0(t) \exp(\alpha_1 \text{TreatmentGroup}_i + \alpha_2 (\text{TreatmentGroup}_i \times \text{PostAmendment}_t))$. i subscripts entity-investor pairs and t subscripts time (Month and Year). TreatmentGroup_i is an indicator equaling 1 if the entity is a member of the treatment group, and PostAmendment_t is an indicator equaling 1 if $t > \text{May 2013}$. Column (1) estimates the model for the treatment group (entities incorporated by EU investors between March 1, 2005 and July 31, 2005) and control group 1 (entities incorporated by non-EU, OECD country investors between March 1, 2005 and July 31, 2005). Column (2) estimates the model for the treatment group and control group 2 (entities incorporated by EU investors between January 1, 2002 and June 3, 2003). Column (3) is a placebo test comparing control group 2 with control group 3 (entities incorporated by non-EU, OECD country investors between January 1, 2002 and June 3, 2003). Column (4) excludes from the sample EUSD-area countries that ended a voluntary disclosure/amnesty program during 2013 or 2014. Observations are at risk from August 1, 2005 onwards. I consider an entity to be closed on the “inactivation date” or right-censored one year before the “struck-off date” or December 31, 2015, whichever is earlier. Reported coefficients are in unexponentiated form, with exponentiated hazard ratios at the bottom of the table. Standard errors are clustered at the investor country level. *, **, and *** denote two-sided statistical significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)	(3)	(4)
TreatmentGroup	-0.602** (0.275)	-0.608** (0.275)		-0.626** (0.281)
Treatment Group \times PostAmendment	1.415*** (0.398)	2.220*** (0.404)		1.413*** (0.420)
ControlGroup2			-0.234 (0.156)	
ControlGroup2 \times PostAmendment			0.065 (0.257)	
<i>Sample Composition</i>				
Treatment Group:	Yes	Yes	No	Yes
Control Group 1:	Yes	No	No	Yes
Control Group 2:	No	Yes	Yes	No
Control Group 3:	No	No	Yes	No
Exclude EUSD Countries with Ending Amnesty:	No	No	No	Yes
Number of Entity-Investor Pairs	1134	1343	884	1097
Number of Closure Events	554	581	282	529
<i>Exponentiated Coefficients</i>				
TreatmentGroup	0.548	0.544		0.535
Treatment Group \times PostAmendment	4.115	9.210		4.108
ControlGroup2			0.792	
ControlGroup2 \times PostAmendment			1.067	

this possibility, I identify the EUSD-area countries that became less forgiving in their voluntary disclosure/amnesty programs during 2013 or 2014, exclude those countries and estimate the model comparing this subsample to control group 1.⁸ Column (4) presents the results; the estimates are virtually identical, ruling out terminations of voluntary disclosure programs driving my results.

4.2.2 FATCA

One of the major limitations of the EUSD is its scope: while the EU can compel banks in EU countries and their overseas territories to comply, it has no legal authority to force financial institutions in other areas to take part in the scheme. In enacting the Foreign Account Tax Compliance Act (FATCA), the United States took a different approach to pressure offshore banking institutions. Targeting the estimated \$1 trillion in US offshore wealth (Alstadsæter et al. 2017), FATCA requires registered Foreign Financial Institutions (FFIs) to identify US account holders and provide identity (e.g. name and taxpayer ID number) and asset information to the IRS on an annual basis. FATCA's bite comes from how it leverages the size and scale of the US financial sector to compel foreign financial institutions to comply. FATCA mandates that US institutions and other compliant FFIs withhold a 30% tax on US-sourced payments to non-compliant FFIs. This tax virtually locks non-compliant FFIs out of the US financial system, and because the US financial system is so integral to the worldwide financial system, remaining non-compliant is not a feasible option. The incentive to comply only grows stronger as more foreign institutions register.

Like the amended EUSD, information exchange under FATCA is not limited to individual accounts. FFIs must identify US-owned foreign corporations, defined as entities with over 10% indirect or direct US ownership. As a result, for an account held in the name of an offshore entity, the bank must trace back ownership to test against the 10% threshold. FATCA explicitly states what criteria should flag an account as potentially US-investor owned. If there are any “indicia” of

⁸I obtain the EUSD-area countries that ended voluntary disclosure programs from a survey by the Organisation for Economic Cooperation and Development (2015). Austria, Belgium, Denmark, and the Netherlands had voluntary disclosure programs that ended or became less forgiving in 2013 or 2014. Throughout the EUSD-area, the United Kingdom was the only country to expand a voluntary disclosure program during 2013 or 2014. I also estimate the model excluding UK investors (untabulated) and find no change in my results, suggesting that my results are not driven by the launch of a voluntary disclosure/amnesty program.

US ownership, such as a US phone number, a US address, or a standing order to transfer funds to a US bank, the FFI must suspect US ownership.

A necessary condition for the FFI to be able to report accounts owned by US investors is that the bank has knowledge of the beneficial owners. If the bank has no knowledge of an entity's shareholders, it cannot report this information to the IRS. While banks historically have been willing and able to open accounts without knowing the ultimate customer, the introduction of “know your customer” (KYC) and “anti-money laundering” (AML) laws in virtually every country restricted their ability to do so. Enacted and/or strengthened throughout the 2000s primarily to fight terrorist funding and other illegal activity, KYC and AML laws compel financial institutions to conduct due diligence on who is opening the account. This diligence typically includes obtaining passports of the beneficial owners and learning the source of funds. As a result, provided they conduct the requisite due diligence, financial institutions cannot claim ignorance when performing FATCA searches for US beneficial owners.

To test for an effect of FATCA on offshore entity usage, I conduct a difference-in-difference analysis of incorporations with US investors as the treatment group and non-US investors as the control group. One of the main challenges in such an approach is determining an appropriate treatment date. While FATCA was enacted in 2010, at first it was highly uncertain if the US government would be able to actually implement it. Financial institutions—both in the US and abroad—objected to becoming de facto IRS agents, and foreign countries—particularly in the EU—voiced concerns about privacy. In many jurisdictions, complying with FATCA and exchanging information with the IRS would cause foreign financial institutions to violate local law. As a result, in the second half of 2012, the US government began to develop intergovernmental agreements (IGAs) with foreign governments to iron out some of the implementation details. While these agreements brought FATCA implementation closer to reality, the countries signing IGAs early on did not have a reputation for facilitating offshore tax evasion.⁹ As a result, investor expectations likely did not

⁹France, Germany, Italy, Spain, the UK and the US developed a model intergovernmental agreement (IGA) that cleared the way for FATCA exchanges from those countries. Released July 2012, this “Model 1” IGA stipulated that FFIs would collect the required information on US taxpayers and submit it to their local government. In turn, the foreign

shift substantially in response to these agreements.

While anticipation of FATCA may have increased somewhat prior to 2013, two events at the beginning of 2013 likely shifted investor expectations considerably. On January 17, 2013 the IRS developed implementation rules and released final regulations. In February 14, 2013 Switzerland signed an IGA with the US government, effectively ending Swiss banking secrecy for US clients and allowing for FATCA exchanges. Given Swiss banks' prominence in the offshore financial industry, that Switzerland was forced to comply likely sent a strong signal to investors that other bank secrecy jurisdictions would not be able to withstand pressure. Since then, the total number of countries having signed IGAs has exceeded 80 with an additional 30 countries reaching "agreements in substance," covering virtually all of the developed world.

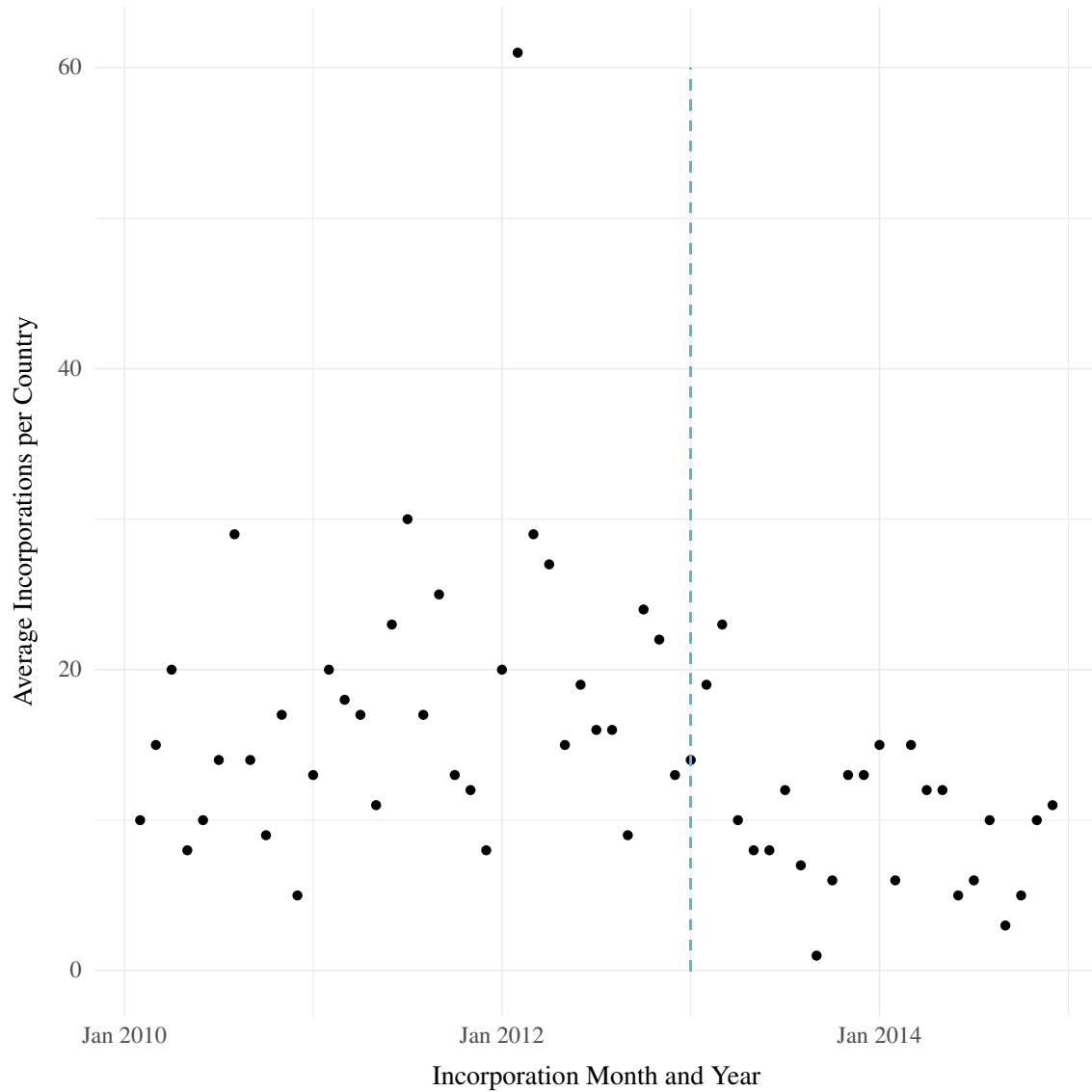
I use January 17, 2013—the date the IRS published the final regulations—as the date when investor expectations changed. Both the finality of the regulations and announcements of key signed (and pending) IGAs around this period eliminated any remaining doubt that the regulation would actually be carried out. Conversations with a practitioner specializing in FATCA compliance confirm that prior to January 2013, clients were typically either unaware of the pending roll-out or hoped the complexities of international relations would undermine the US's ability to execute FATCA. Partial anticipation before this date or investors remaining uncertain of FATCA's inevitability after this date will dampen the treatment effect in my difference-in-difference tests.

In figure 4.4 I plot monthly incorporation activity from US investors. The dashed blue line represents January 17, 2013; after this date, US investors' incorporation activity falls substantially, consistent with offshore entities losing value as a tax evasion tool for US investors.¹⁰

government would then forward on the information to the IRS. After the release of the Model 1 IGA, the UK signed in September, Denmark and Mexico signed in November, and Ireland signed in December. While Ireland is included in a number of tax haven lists (e.g. Gravelle (2009)), it primarily serves as a corporate tax haven and is not a major locale for individual offshore evasion.

¹⁰The outlier point in February 2012 is driven by one entity with nearly 1000 investor links. To guard against overestimation of the effect size because of this one outlier, I exclude February 2012 from all of my FATCA regressions.

Figure 4.4: **Incorporations around FATCA.** Points depict the average number of incorporations per month from US investors. The dashed blue line indicates January 2013—the point in time I consider investor expectations of FATCA actually being implemented to have changed.



To test for an effect more formally, I employ the following model:

$$\ln(1 + Incorporations_{it}) = \alpha PostFATCA_{it} + \beta_i + \gamma_t + \varepsilon_{it} \quad (4.4)$$

where $PostFATCA_{it}$ takes a value of 1 if country i is the United states and t is after January 2013. β_i and γ_t are investor country and time (month and year) fixed effects, leaving α as the estimate of the change in incorporation activity for US investors around the January 2013 date. I estimate the regression using observations from January 2010 (just before FATCA's March 2010 enactment date) through December 2014. Table 4.4 presents the results.

Column (1) shows that after January 2013, Offshore incorporation activity from US investors declined by roughly one-third ($e^{-0.390} = 0.68$). On April 9, 2013, France, Germany, Italy, Spain, and the UK announced they would conduct FATCA-style exchanges among themselves and the US, likely signaling to investors in these countries that their offshore entities are no longer safe. Thus, in Column (2) I include an indicator $PostEU5Announce_{it}$ that turns on if i is one of these 5 countries and $t \geq$ April 2013. Similar to FATCA, I find a roughly 16% reduction in the number of incorporations per month from these countries ($e^{-0.169} = 0.84$).

To verify that intertemporal differences between developed and emerging economies are not driving the result, in Column (3) I re-estimate the model using observations from OECD countries only. The result is robust to this alternate specification. In Column (4) I relax the parallel trend assumption by allowing incorporation activity from US investors to have a different linear and quadratic trend from other countries' investors over time. The coefficient on $PostFATCA_{it}$ remains negative and significant even allowing for independent linear and quadratic trends in incorporation activity for US investors, but the magnitude of the effect decreases slightly.

On June 14, 2013 the ICIJ released an earlier batch of leaked offshore entity data from two providers: Portcullis TrustNet and Commonwealth Trust Limited. This leak is much smaller than the Panama Papers leak and the data ended years before it was released, but it may have scared off investors considering incorporating offshore. If investors from all countries are affected similarly, the time fixed effects should absorb it. However, if US investors respond to the 2013 leak more

Table 4.4: Regression Evidence of FATCA and Incorporation Activity. Column (1) estimates the model: $\ln(1 + Incorporations_{it}) = \alpha PostFATCA_{it} + \beta_i + \gamma_t + \varepsilon_{it}$. i subscripts investor country and t subscripts time (Month and Year). $PostFATCA_{it}$ is an indicator equaling 1 if $t > \text{January 2013}$ and i is the United States. Column (2) adds an indicator $PostEU5Announce_{it}$ which equals 1 if $t \geq \text{April 2013}$ and i is France, Germany, Italy, Spain, or the UK. Column (4) adds two additional variables to the model from column (1). $UStrend_{it}$ is the number of months after December 2009 if i is the United States and 0 otherwise. $UStrend2_{it}$ is the square of $UStrend_{it}$. Column (5) adds one variable to the model from column (1); $PostOffshoreLeaksUS_{it}$ is an indicator equaling 1 if $t > \text{June 2013}$ and i is the United States. Column (6) adds $StockMarketGrowth_{it}$, the percentage growth in country i 's stock market from the same month in the prior year, and $CPIGrowth_{it}$, which measures the year over year percentage growth in the seasonally adjusted consumer price index for month t in investor country i . Each column is estimated on incorporation activity between January 2010 and December 2014 from non-haven investor countries. Column (3) further restricts the sample to investors from OECD countries. The model is estimated using OLS with standard errors clustered by investor country and time. *, **, and *** denote two-sided statistical significance at the 10%, 5%, and 1% levels respectively.

	ln(1 + Incorporations)					
	(1)	(2)	(3)	(4)	(5)	(6)
PostFATCA	-0.390*** (0.151)	-0.395*** (0.048)	-0.362*** (0.067)	-0.330*** (0.051)	-0.345*** (0.049)	-0.323*** (0.056)
PostEU5Announce		-0.169** (0.074)				
UStrend				0.023*** (0.004)	0.007* (0.004)	0.008* (0.004)
UStrend2				-0.0004*** (0.0001)	0.00001 (0.0001)	0.00002 (0.0001)
PostOffshoreLeaksUS					-0.396*** (0.067)	-0.402*** (0.078)
StockMarketGrowth						0.0003 (0.001)
CPIGrowth						0.002 (0.006)
<i>Sample Composition</i>						
Investor Countries	All	All	OECD	All	All	All
<i>Fixed Effects</i>						
Investor Country:	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year:	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	7,077	7,077	1,488	7,077	7,077	2,969

negatively than investors in other countries, it could show up in my estimate of the FATCA effect. To address this possibility, in Column (5) I employ the same specification from Column (4), but also include an indicator $PostOffshoreLeaksUS_{it}$ which turns on for US investors after June 2013. In this specification, my estimate of the FATCA effect is largely unchanged, but the coefficient of $PostOffshoreLeaksUS_{it}$ absorbs most of the linear trend and all of the quadratic trend in US incorporation activity, suggesting that the leak is not driving my results. The leak may disproportionately affect US investors because of FATCA (FATCA combined with weaker than expected identity protections may be particularly troubling to US investors considering using offshore entities), but I am unable to test if such an interactive effect exists. To help rule out changing market and economic conditions driving my results, in Column (6), I control for growth in the investor's stock market and local consumer price index. Inclusion of these variables does not meaningfully change my estimates of FATCA's effect.

The time fixed effects account for monthly differences in the average country's incorporation activity. However, as the fourth most active non-haven investor country in terms of incorporation activity, the US is not an average country. As a result, using intertemporal changes in the average country's incorporation activity may be insufficient as a predictor of changes in US incorporation activity. To address this possibility, I test to see if the proportion of US incorporation activity changed from the pre- to post-period. Table 4.5 presents the results of a χ^2 test of equal proportions. In the year prior to the January 17, 2013 date when the IRS released the final FATCA rules, US investors represented 4.7% of incorporation activity worldwide, excluding haven country investors and instances where the investor country is unknown (i.e. bearer share entities). In the subsequent year, US activity falls to 2.8%, and this difference in proportions is significant with a P-value of better than 0.001. When I further constrain the comparison group to OECD investors only over the same periods, I observe a decline from 23.4% to 16.8%, which is again significant with a P-value

of better than 0.001.¹¹

Table 4.5: Proportionality of US incorporation activity around FATCA. This table presents comparisons of the Proportion of incorporation activity coming from US investors during various periods around FATCA. The non-haven comparison group represents incorporation activity from non-US investors known to be from a non-haven country per Gravelle (2009). The OECD comparison group adds the further restriction that the investor must hail from an OECD country.

Period	Dates	US Count	Comparison Groups			
			Non-Haven		OECD	
			Count	Proportion	Count	Proportion
Full pre-period	Jan 1, 2010 - Jan 17, 2013	664	16181	0.039	2717	0.196
1-year Prior	Jan 17, 2012 - Jan 17, 2013	262	5320	0.047	860	0.234
1-year Post	Jan 18, 2013 - Jan 17, 2014	137	4777	0.028	677	0.168
Post, Pre-Leaks	Jan 18, 2013 - Jun 14, 2013	71	2359	0.029	280	0.202

Comparison	Non-Haven Countries		Non-Haven OECD Countries	
	χ^2 Test Statistic	P-Value	χ^2 Test Statistic	P-Value
Full pre-period to 1-year Post	13.961	0.000	3.171	0.075
1-year Prior to 1-year Post	25.435	0.000	11.864	0.001
1-year Prior to Post, Pre-Offshore Leaks	12.902	0.000	1.317	0.251

Across these specifications, my estimates of the effect size are large. In a concurrent working paper, De Simone et al. (2017) use changes in Foreign Direct Investment from IGA-signing tax havens to infer a similarly sized effect (22-31% decline in aggregate outbound FPI depending on the specification). These large magnitudes raise the possibility that investors continue to evade but simply change their concealment tactics.¹² Without tax receipts I cannot definitively rule out such a substitution effect, however, presumably any second choice concealment strategy entails greater

¹¹I also compare the year prior to the period between January 18, 2013 through June 14, 2013 (when the ICIJ released the earlier leak). When I compare changes in the proportion of US-investor activity relative to worldwide activity, I observe a highly significant decline. However, I do not detect a statistically significant change relative to the OECD countries over this short window.

¹²Some recent tax evasion studies find a substitution effect when one method of evasion becomes difficult. For example, Slemrod, Collins, Hoopes, Reck, and Sebastiani (2017) find that after an enforcement change, small businesses report an increase in their taxable receipts by 24%, but they also increase their reported expenses by a similar amount, suggesting the evaders changed tactics and tax revenue changed little. Carrillo, Pomeranz, and Singha (2017) find a similar response in an Ecuadorian setting. On the other hand, using IRS data Johannesen, Langetieg, Reck, Risch, and Slemrod (2017) find that first time Foreign Bank Account Report (FBAR) filers responding to stepped-up enforcement increase their reported taxable income substantially (64% more interest income, 24% more dividends, and 13% more capital gains).

risk or higher costs.

4.2.3 Ending Bank Secrecy

Critical to the amended EUSD and FATCA having bite in curbing the use of offshore entities for evasion purposes, financial institutions must actually comply with the regulations. However, financial institutions that benefit from the offshore tax evasion business have a strong business incentive not to comply with information exchange programs, and the evidence in Section 4.1.2 shows that banks actively help clients to circumvent reporting. Thus, to confirm that the observed effects are indeed a result of financial institutions' exchange of corporate account information, I test for an investor response to increases in bank cooperation with foreign tax authorities. To do so, I exploit two shocks to the Swiss banking sector: UBS's deferred prosecution with the US Department of Justice and the launch of the Department of Justice's Swiss bank program.

As the historic leading location for locating offshore wealth with over \$5 trillion in 2007 (Alstadsæter et al. 2017), Switzerland is an ideal testbed. In February 2009, the US Department of Justice announced that it had struck a deferred prosecution agreement with the Swiss bank UBS for UBS's role in facilitating US tax evasion. Under the terms of the agreement, UBS would turn over its records of accounts held by US investors (including those employing offshore entities) and cooperate with any criminal investigations and prosecutions. On the heels of a June 2008 guilty plea from former UBS banker Bradley Birkenfeld and the November 2008 indictment of UBS executive Raoul Weil for their roles in facilitating evasion, this deferred prosecution agreement credibly communicated that UBS would not stonewall.

I predict that this agreement undermined investor credibility in the anonymity of Swiss bank accounts held by offshore entities. While the UBS deferred prosecution agreement only established the release of account information from one bank, UBS, to one country, the United States, the event likely undermined worldwide faith in the secrecy of the entire Swiss banking system. As a result, I hypothesize that investors whose entities used Swiss banks expected an increase in the probability of detection. The continued use of these entities may also increase the penalty upon getting caught if governments interpret the entities as evidence of intent to defraud the tax authority. Thus the

expected cost of evasion increases, potentially from both the increase in probability of detection and the increase in penalty upon detection.

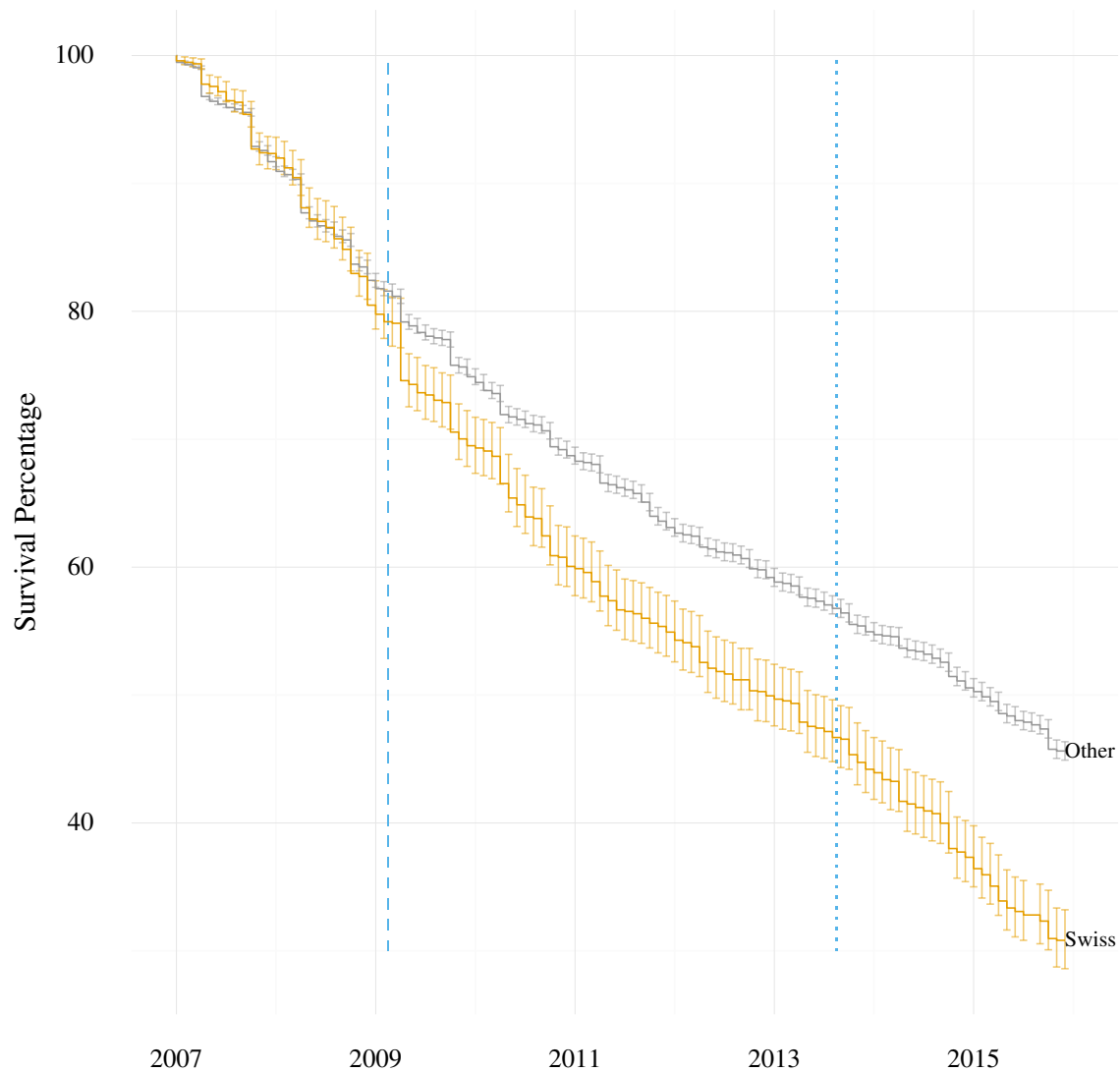
Similar in effect to the 2009 shock, in August 2013 the Swiss and US governments established a program where Swiss banks could cooperate with US government investigations into tax evasion in exchange for non-prosecution agreements. The Swiss Federal Department of Finance encouraged banks to take part in the program and 78 banks participated, representing a sizable portion of the Swiss banking sector. I hypothesize that this program further increased investor expectations of Swiss banks' willingness to cooperate with foreign governments.

I test if investors respond to increases in the likelihood of bank cooperation by conducting a difference-in-difference analysis on closure rates of corporate entities with Swiss bank exposure around the two shocks. However, the released Panama Papers data do not specify the financial institution used by the entities. Thus, as a proxy for having a Swiss bank account, I assume that entities set up with a Swiss intermediary likely use a Swiss bank. It seems unlikely that a non-Swiss investor would seek assistance from a Swiss law, accounting, or wealth management firm but not use a Swiss financial institution.

Figure 4.5 presents Kaplan-Meier survival curves based on the entities being set up with a Swiss intermediary. The sample consists of entities incorporated over a five year window, 2001-2006, that were still active as of January 1, 2007. Like the prior survival analyses, I define the close date as the inactivation date in the data, and right censor observations at the earlier of one year before the struck-off date or December 31, 2015. Because of the potential confounds of the amended EUSD with the 2013 shock, I exclude incorporations with EU investors.¹³ Since Section 4.1.2 shows that many bearer share entities were created with direct involvement from banks, I exclude them as well. I also exclude instances where the investor is listed as in a tax haven country, to make sure I capture entities held directly by investors. The dashed blue line depicts the UBS shock whereas the dotted blue line portrays the announcement of the Department of Justice's Swiss bank program.

¹³The coincidental timing brings up the possibility that the results in Section 4.2.1 are driven by developments in the Swiss banking industry and not the amended EUSD. To rule out this possibility I re-run the results from Section 4.2.1, excluding entities where the intermediary is Swiss, and the results remain the same.

Figure 4.5: Closures of entities likely using Swiss banks. This graph plots Kaplan-Meier survival curves based on the incorporation having a Swiss intermediary. The sample include all entity-officer pairs incorporated between January 1, 2001 and December 31, 2006, excluding instances where the investor country is in the EU or is Tax Haven Country per Gravelle (2009), and omitting Bearer Share incorporations. I consider entities to be closed on the “inactivation date” the data, or right-censored at the minimum of the “struck-off date” or December 31, 2015. I consider observations at risk from January 1, 2007 onward. The dashed blue line indicates when UBS and the US government entered a deferred prosecution agreement. The dotted blue line depicts the start of the US Department of Justice’s Swiss Bank Program. Error bars depict 95% confidence intervals.



The curves show that prior to the first shock, the decay rate of entities is the same regardless of whether or not the entity has a Swiss intermediary. However, around the UBS shock roughly 4-5% of entities with Swiss intermediaries are abruptly closed and the closure rate is higher (steeper downward curve) for the subsequent year. From early 2011 onward, the curves again move in parallel until the August 2013 shock where again the closure rate for entities with Swiss intermediaries increases relative to other entities.

To evaluate the effect formally, I estimate a Cox proportional hazard model in a difference-in-difference style analysis:

$$h_i(t) = h_0(t) \exp(\alpha_1 \text{SwissIntermediary}_i + \alpha_2 (\text{SwissIntermediary}_i \times \text{PostEvent}_t)) \quad (4.5)$$

where i subscripts entity-investor pairs and t subscripts time (year and month). $\text{SwissIntermediary}_i$ is an indicator if the entity-investor pair has a Swiss intermediary, and PostEvent_t is an indicator if t is after the event date. I employ two event dates: February 2009 for the UBS agreement and August 2013 for the launch of the Department of Justice's Swiss bank program. Columns (1) and (2) test the first event, whereas (3) and (4) test the second.

In column (1), I use entities that were incorporated between January 1, 2001 and December 31, 2006 where the investor country is not a haven country and the entity is not set up with bearer shares. I find no difference between entities likely using Swiss bank accounts and the control group prior to the UBS agreement. After the agreement, the closure rate for entities with likely Swiss bank accounts increases by 33.8%. Despite the UBS agreement only explicitly affecting US investors, it shook faith in the continued secrecy of the Swiss banking sector for investors worldwide. In column (2), I repeat the estimation but exclude US investors, and find nearly identical results to column (1). In column (3) I use a broader incorporation window, 2001 through 2010, but I exclude EU investors to make sure I am not picking up an effect from the Amended EUSD. I find a 48.5% increase in the closure rate for entities likely using Swiss banks after the Swiss bank program launch. This result is virtually identical when I exclude US investors in column (4), ruling out the potentially confounding influence of FATCA and reinforcing that investor beliefs about Swiss

Table 4.6: Closures of entities with probable Swiss bank accounts. Columns (1) and (2) estimate the model: $h_i(t) = h_0(t) \exp(\alpha_1 \text{SwissIntermediary}_i + \alpha_2 (\text{SwissIntermediary}_i \times \text{PostUBS}_t))$. i subscripts entity-investor pairs and t subscripts time (Month and Year). $\text{SwissIntermediary}_i$ is an indicator equaling 1 if the entity has a Swiss intermediary, and PostUBS_t is an indicator equaling 1 if $t > \text{February 2009}$. Columns (1) and (2) include entities with an incorporation date from January 1, 2001 through December 31, 2006; columns (3) and (4) extend this window through December 31, 2010. Observations are at risk from January 2007 onwards for columns (1) and (2), and from August 2011 onward for columns (3) and (4). The sample excludes instances where the investor is from a Tax Haven Country per Gravelle (2009) and when the entity is set up with bearer shares. Columns (2) and (4) exclude US investors; Columns (3) and (4) exclude EU Investors. I consider an entity to be closed on the “inactivation date” or right-censored one year before the “struck-off date” or December 31, 2015, whichever is earlier. Reported coefficients are in unexponentiated form, with exponentiated hazard ratios at the bottom of the table. Standard errors are clustered at the investor country level. *, **, and *** denote two-sided statistical significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)	(3)	(4)
SwissIntermediary	0.047 (0.173)	0.042 (0.177)	0.033 (0.107)	0.021 (0.111)
SwissIntermediary \times PostUBS	0.291** (0.133)	0.287** (0.135)		
SwissIntermediary \times PostSwissBankProgram			0.396*** (0.139)	0.399*** (0.145)
<i>Sample Composition</i>				
EU investors	Yes	Yes	No	No
US investors	Yes	No	Yes	No
Number of Entity-Investor Pairs	23690	23097	30569	29536
Number of Closure Events	6963	6835	10271	9904
<i>Exponentiated Coefficients</i>				
SwissIntermediary	1.048	1.043	1.033	1.022
SwissIntermediary \times PostUBS	1.338	1.332		
SwissIntermediary \times PostSwissBankProgram			1.485	1.490

banks' willingness to cooperate changed worldwide. Together these results suggest that investors use offshore entities less when their confidence in banks' maintaining secrecy is shaken. This finding is consistent with bank cooperation increasing the probability of detection and reducing the benefits of offshore entities as a concealment technology.¹⁴

4.3 Additional Analyses

4.3.1 Tests of Sample Representativeness

One potential threat to the validity of my inferences is the representativeness of Mossack Fonseca's activity compared with other incorporation service providers. To help rule out this possibility, I exploit a new leak from the International Consortium of Investigative Journalists: the Bahamas Leaks. On September 21, 2016, the ICIJ appended the Panama Papers database with a leaked copy of the Bahamian government's corporate registry. The leak includes all of the offshore entities created in the Bahamas from 1990 to the beginning of 2016, resulting in approximately 175,000 entities. In contrast to the Panama Papers which has entities created by one law firm in many jurisdictions, the Bahamas Leaks have entities created by all service providers, but only the entities incorporated in the Bahamas. If my results hold in the Bahamas Leaks sample, I can rule out that Mossack Fonseca's activity is not representative of the industry as a whole.

The basic structure of the Bahamas Leaks data is quite similar to the Panama Papers, but there are a few key differences. Because the data source is the Bahamian government's corporate registry, the data contain only the information that was reported to the government by the service provider. As a result, some of the elements in the Panama Papers are missing in the Bahamas Leaks. Most importantly, because the Bahamian corporate registry does not maintain shareholder lists, the Bahamas Leaks do not contain the investor identities. There is sometimes a named officer in the data, but it is unclear if this officer is an actual investor or a nominee director, and the officer

¹⁴It is possible that the distribution of incorporation dates across the Swiss intermediary and non-Swiss intermediary subsamples is different. For instance if entities have a consistent half life regardless of the intermediary, but the incorporation dates of the Swiss-intermediary entities are clustered to the start of the sample, I could observe a spurious result. To rule out the possibility, I re-estimate the four specifications but use separate strata for each year of incorporation. This approach allows each year of incorporation to have a unique unspecified baseline hazard function. The estimated coefficients and statistical significance are virtually identical (untabulated for brevity), eliminating the possibility of heterogeneity in the incorporation date driving the results.

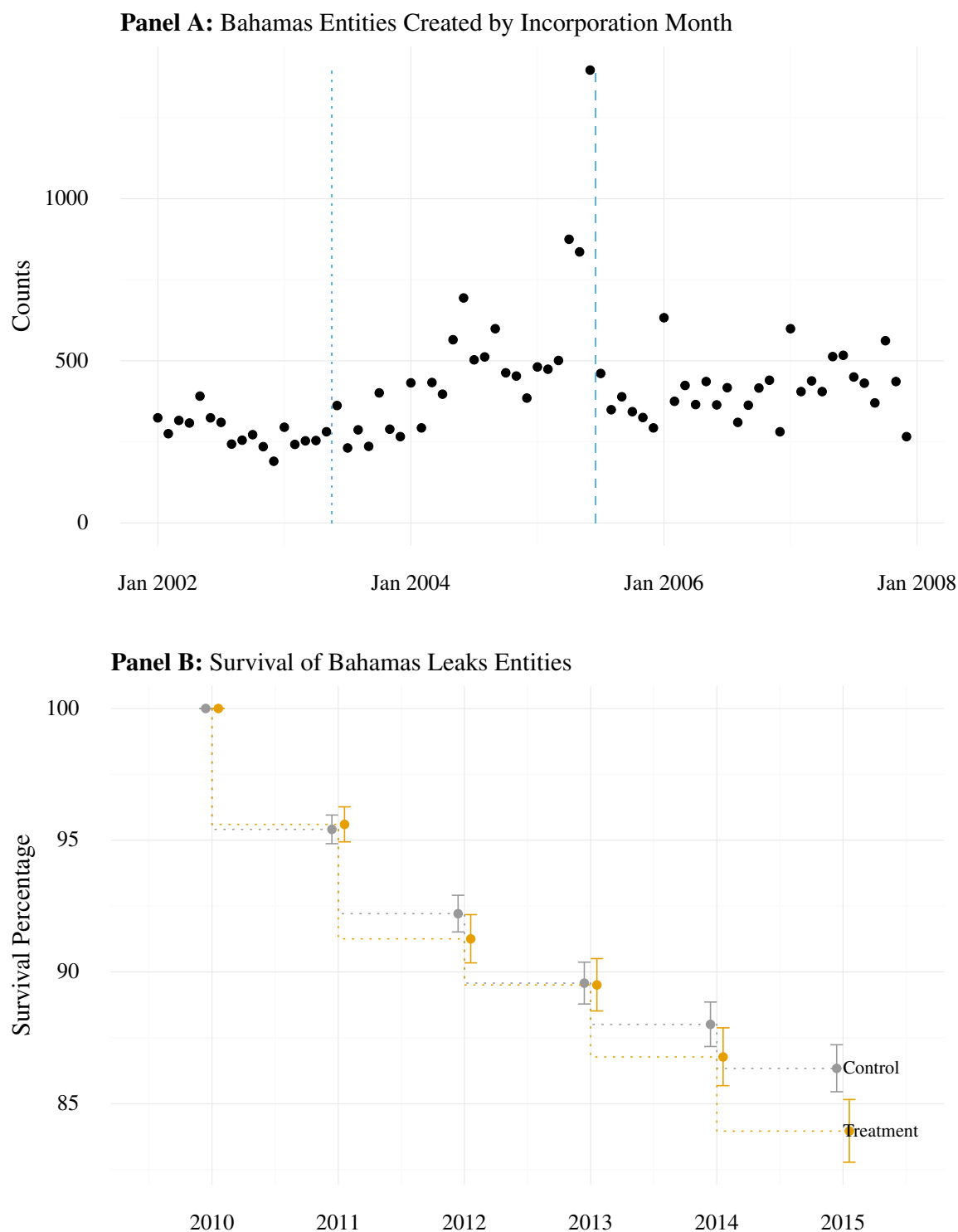
does not have address or country information. Hence, I am unable to determine the investor's home country. Additionally, the "intermediaries" captured in the data are different than those in the Panama Papers; while in the Panama Papers the intermediary is the party that interfaces with the actual investor, an intermediary in the Bahamas Leak is the service provider that actually executed the incorporation (e.g. Mossack Fonseca is an intermediary in the Bahamas Leaks). The Bahamas Leaks data also do not have inactivation dates reflecting when the investor decided to dissolve the entity. Rather, the only indication of a dissolved entity is a populated struck-off date: the date where the government struck the entity off the corporate registry because the recurring service fees were not paid. All of the struck off dates in the Bahamas Leaks happen in the last few days of January or the first few days of February, suggesting that the Bahamian government conducts annual purges at this time of the year.

Because of these data differences, I cannot replicate my tests from the Panama Papers directly using the Bahamas Leaks data. However, I am able to conduct less powerful variants of two of them: the increase in activity around the EUSD roll-out, and the differential closure rate when the EU adds corporate accounts to the EUSD's information exchange. Rather than conduct a difference-in-difference test comparing EU investor activity to non-EU investor activity, I determine if the overall number of new entities incorporated in the Bahamas spikes around the EUSD. Because I am unable to pull out the non-EU investor entities, this analysis is necessarily noisier than my tests using the Panama Papers data. I adopt a similar modification for evaluating the closure rates: I look to see if entities created around the EUSD roll-out are more likely to close after the move to complete information exchange than entities created before the EUSD was enacted. Again, this test is noisy because I cannot exclude non-EU investor entities from the sample.

Nevertheless, Figure 4.6 presents the results. Panel A plots the number of new entities in the Bahamas Leaks by incorporation month. Unlike Figure 4.1, this plot counts entities, not entity-investor pairs. I detect the same spike around the July 1, 2005 roll-out date, suggesting that the observed investor behavior is not specific to Mossack Fonseca.

Panel B presents survival curves analogous to Panel C of Figure 4.3. Here, the treatment

Figure 4.6: Panama Papers representativeness. This figure uses Bahamas Leaks data to assess the representativeness of the Panama Papers data. Panel A presents the number of new entities created in the Bahamas per month. Panel B presents Kaplan-Meier survival curves based on incorporation date. The treatment group consist of entities incorporated between March 1, 2005 and July 31, 2005, and the control group consists of entities incorporated between January 1, 2001 and June 3, 2003. I use the struck-off date as the termination date and right censor entities that are not struck off by December 31, 2015. I exclude from both the treatment and control groups entities that were struck off prior to January 1, 2010. Error bars depict 95% confidence intervals.



group are Bahamas Leaks entities created between March 1, 2005 and July 31, 2005. The control group are entities created between January 1, 2001 and June 3, 2003.¹⁵ Because I only observe the annual purges, my estimate of when the investor chooses to abandon the entity is necessarily noisy. For instance, an entity struck off in the January/February 2015 purge was presumably struck off because the investors did not pay the 2014 registration fees to the Bahamian government. As a result, the last fee was likely paid at some point in 2013, meaning that the investor abandoned the entity either in 2013 after paying the fee or in 2014. Thus, the sharp drop from the treatment group after May 2013 in Panel C of Figure 4.3, would show up in Panel B of Figure 4.6 as starting in 2014 and accelerating in 2015. Indeed, I observe this pattern. The curves depict the survival rates for entities in each group that have not been struck-off before January 1, 2010. I start the at-risk period later for this analysis to allow purges to begin in the treatment group, given the lag between investor abandonment and the struck off date. The 95% confidence intervals overlap up to 2014, where the treatment group begins to exhibit a higher closure rate. By 2015 the confidence intervals of the survival rates no longer overlap; the treatment group exhibits higher attrition. This result is consistent with the pattern in Figure 4.3, suggesting that the Panama Papers data is indeed a representative sample of investors.

4.3.2 Additional Potential Contaminating Forces

With any difference in difference analysis, contamination from concurrent events may result in spurious inferences. In my analyses I explicitly address a number of potential threats (e.g. Offshore Leaks disclosure, changes in amnesty programs, and the introduction of the Common Reporting Standard). While it is impossible to completely rule out all other possibilities, I consider two of the most probable ones here.

Tax Information Exchange Agreements (TIEAs) are bilateral agreements that allow tax authorities to request information from tax haven governments about specific suspected evaders. While

¹⁵For this Bahamas Leaks analysis I extend this control group window a year earlier than the Panama Papers analysis to boost power, counteracting the noisiness resulting from the inclusion of non-EU investors and the imprecision of the closure dates.

these agreements are weak by design, other studies have detected effects.¹⁶ The bulk of these agreements were signed in late 2009 and 2010 just after the OECD threatened sanctions on any haven that did not sign a minimum of 12 agreements. Thus, the timing poses a potential problem primarily for my first Swiss bank shock. However, Switzerland signed its first TIEA in 2013, and even then, the TIEAs were only with fellow tax havens, making it unlikely that TIEAs could be driving my results.

The Multilateral Convention on Mutual Administrative Assistance in Tax Matters (MCAA) builds on the TIEA concept. Championed by the OECD, this convention provides a similar mechanism for information exchanges as TIEAs, but has the added benefit of pertaining to a fully connected network of countries as opposed to country pairs. Out of Mossack Fonseca's major havens, Seychelles signed in 2015, Samoa and Panama signed in 2016, and Bahamas has not signed as of 2017. Thus, the timing of these jurisdictions' participation could not have induced my results. In November 2013, the UK extended its ratification to cover its protectorates (including the British Virgin Islands and Anguilla) effective March 2014. To rule out this extension driving my strengthened EUSD or my FATCA results, I rerun these analyses excluding entities created in either of these jurisdictions. My results are robust to this sample change (not tabulated for brevity). Switzerland signed in October 2013, raising the possibility that the MCAA and not the US DoJ's Swiss Bank Program induced the 2013 increase in closures of entities with Swiss bank accounts.¹⁷ While I cannot rule out this possibility for my second shock to Swiss banking, the timing cannot explain the increased closures around the 2009 deferred prosecution agreement.

¹⁶Johannesen and Zucman (2014), Hanlon et al. (2015) and Bennedsen and Zeume (2015) explore the effect of these TIEAs and find results on bank deposit flows, foreign direct investment, and firm governance respectively.

¹⁷Switzerland signed the agreement on October 15, 2013, but the Swiss Parliament did not ratify it until December 2015.

CHAPTER 5

CONCLUSION

The recent release of the Panama Papers brought the use of offshore entities to the forefront of public attention. Policymakers are calling for additional tools to clamp down on tax evasion. Thus, understanding how prior regulatory efforts affected this industry is key for making informed policy decisions going forward. This paper provides a first-look at recently released Panama Papers data on offshore entities and presents evidence about the effect of a series of regulatory attempts designed to bring transparency to foreign asset ownership.

My results showcase investors attempting to hide their assets from their home governments. Perhaps more surprising than investors' desire to conceal is the active role played by financial institutions in these schemes. Bank secrecy is a key ingredient to the ability of an offshore entity to provide meaningful concealment from the tax authorities. I find that when investors lose confidence in their bank as a supportive partner in crime, they are less likely to use offshore entities—as evidenced by fewer incorporations and increased closures.

However, reluctant to cede their role in the lucrative offshore asset business, banks take an active role in thwarting government efforts to promote transparency. In the case of the EUSD, I find banks taking the lead in setting up legal structures in tax havens to circumvent disclosure of their clients' assets to the government. While these high-net-worth investors can hardly be considered unwitting victims of cunning banks that push them deeper into illicit activity, my results do point to supply-side forces driving some of the use of tax haven shell companies.

My results have policy implications. First and foremost, it appears that applying pressure to banks is a powerful way to shape investor behavior. The large elasticities across all of the regulatory changes suggest that investors view the disclosure of their asset holdings to the government as a real threat and shift their concealment behavior in response. Second, it appears that competitive

pressures among banks is an important force on offshore asset concealment. Provided the pressure applied to banks is not uniform, pressured banks will be concerned with losing market share and will seek out ways to skirt the spirit of the regulations. These findings lend empirical support for the theory laid out in Elsayyad and Konrad (2012), suggesting that a sequential approach to clamping down on tax havens may be counterproductive. Third, governments with powerful financial systems can effect change even if they do not have direct legal authority over offshore banks. While smaller governments may not have the same leverage, the spillover effects I find suggest that bank reputation matters, raising the possibility that small countries may benefit in reduced evasion by piggybacking on the efforts of larger economies.

While I provide robust evidence that carefully crafted exchange programs and pressure on financial institutions to comply can be an effective deterrent to the use of offshore entities for concealment purposes, I am unable to determine conclusively if they reduce tax evasion. Investors may turn to other concealment technologies that are either riskier or more expensive. For instance, investors may move investments to anonymous currencies like Bitcoin or enlist the help of even less scrupulous financial institutions that are more willing to commit fraud on behalf of their clients. Unfortunately, given the scope of the Panama Papers data, I am unable to test these possibilities. I leave these questions to future research.

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